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# Guidelines for CPA participation in government audit engagements to evaluate economy, efficiency, and program results; Management advisory services guideline series, no. 6

American Institute of Certified Public Accountants

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# management advisory services

**GUIDELINE SERIES NUMBER 6**

**Guidelines for CPA Participation  
in Government Audit  
Engagements to Evaluate  
Economy, Efficiency, and  
Program Results**

## NOTICE TO READERS

Management Advisory Services guidelines are published to assist members in carrying out various types of services. This publication, *Guidelines for CPA Participation in Government Audit Engagements to Evaluate Economy, Efficiency, and Program Results*, was developed by the Task Force on Evaluation of Efficiency and Program Results and approved for publication by the Management Advisory Services Executive Committee.

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Engagements to Evaluate  
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# **Guidelines for CPA Participation in Government Audit Engagements to Evaluate Economy, Efficiency, and Program Results**

## **Introduction**

The issuance in 1972 by the United States General Accounting Office (GAO) of *Standards for Audit of Governmental Organizations, Programs, Activities & Functions* significantly expanded the meaning of the word *audit* when it is to be applied to government and government-funded activities. As a result, the CPA engaged to perform a government audit in accordance with GAO standards may now be expected to do far more than in the past. In addition to the traditional examination of financial statements in accordance with generally accepted auditing standards, audits (as defined by the GAO) of government entities may be concerned with evaluative questions such as:

- Is the entity managing or utilizing its resources in an economical and efficient manner?
- Is the entity achieving the desired results or benefits?
- Are the entity's operations in compliance with applicable laws and regulations beyond those relevant to a financial audit?

The additional objectives designated by the GAO pose extensive challenges for the practitioner who chooses to conduct such expanded-scope government audits. He will be called upon to use not only his financial auditing and accounting skills, but a variety of management advisory services skills as well. He will,



in fact, be conducting evaluations which will require judgments based on expertise which may not be available within his staff and which are normally associated with other professional disciplines, such as engineering, medicine, social sciences, and public administration. The CPA undertaking such engagements, therefore, should be aware of the potential problems associated with these additional requirements and should understand how existing AICPA standards apply to expanded-scope audits as defined by the GAO.

The purpose of this document is to guide the CPA considering participation in such an engagement for any entity at the federal, state, or local levels to which the GAO audit standards apply.<sup>1</sup> The GAO's document does contain the basic information about their standards, but certain ramifications for public accounting firms are not always clear. The standards were written for government audit agencies as well as public accounting firms.

Since CPAs will increasingly be engaged to perform audits as defined by, and *in accordance with*, GAO standards, it is essential to understand what may be involved in making a commitment to do so. Unless the CPA is careful to reach an understanding of the scope of such an audit with those who authorize the engagement—and to document that understanding in the engagement agreement—he could easily overextend his available resources or fail to deliver what is expected.

*This document does not intend to set standards for government engagements to evaluate economy, efficiency, and program results.* Engagements of this kind, in response to the 1972 GAO standards, are still an evolving area of practice requiring further practical experience by members of the profession. Ultimately, a publication similar to those in the AICPA's audit guide series should be issued covering government economy, efficiency, and program results evaluations as well as financial audits. This publication is designed to provide guidance in the interim period. It examines the GAO standards from the CPA's perspective rather than that of a government audit agency.

The specific objectives of the chapters that follow are these—

- To give CPA firms and individual practitioners a better understanding of expanded-scope government audits as

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<sup>1</sup> Throughout this publication the term *CPA* refers to a CPA firm or sole practitioner. The term *practitioner* refers to the individual professional personnel conducting the evaluation engagement.

defined by the GAO and the related knowledge and qualifications they should possess or acquire in undertaking this kind of engagement (chapter 1).

- To assist CPAs in assessing the desirability and appropriateness of responding to government requests for proposals (RFPs) to conduct such engagements (chapter 2).
- To explain certain techniques and constraints that may be involved in the conduct of such engagements (chapter 3).
- To provide illustrations helpful in the development of work programs for economy and efficiency evaluations in such engagements and to encourage greater consistency in such work programs for selected functional areas (chapter 4).
- To increase awareness of the continuing developments in the "state of the art" of evaluating program results (effectiveness) (chapter 5).
- To provide information and examples helpful in preparing reports on findings and recommendations not related to the financial audit (chapter 6).
- To interpret existing AICPA professional standards as they may apply to expanded-scope government audits (chapter 7).

## Chapter 1

# Elements of Government Audits

In its 1972 publication *Standards for Audit of Governmental Organizations, Programs, Activities & Functions*, and in subsequent publications, the GAO expanded the use of the term *audit* to include—

1. *An examination*, in accordance with generally accepted auditing standards, of financial transactions, accounts, and reports, including an evaluation of compliance with applicable laws and regulations. Such examination may lead to the expression of an opinion on the fairness of the presentation of financial statements in accordance with generally accepted accounting principles (or other specified accounting principles).
2. *An evaluation of economy and efficiency* relating to operations, administration, and management leading to specific citations of problem areas and, when possible, recommendations for corrections or improvements.
3. *An evaluation of program results* leading to a statement of findings regarding the attainment of established objectives of the program or organization and, when possible, including recommendations for improving effectiveness.

In addition, the GAO specifies that evaluations of economy, efficiency, and program results should also include an examination of whether an entity's *operations* meet applicable legal and regulatory requirements, thus extending the compliance aspects of a financial audit to nonfinancial matters. This lengthy definition is indicative of the complexity which an expanded-scope government audit, as defined by the GAO, may entail. Though such expanded-scope audits are not always required, all concerned should be aware that *an audit in accordance with the GAO standards* may entail all of the above elements unless the engagement agreement clearly limits the work to be done. The executive branch of the U.S. government, in Federal Management Circular

73-2, has adopted the expanded-scope concept and directed its agencies to conduct audits in accordance with the GAO standards. The circular includes the following statement:

In developing audit plans, however, the audit scope should be tailored to each specific program according to the circumstances relating to the program, the management needs to be met, and the capacity of the audit facilities.

Although the GAO standards document assumes that government audits may involve all of the expanded-scope audit elements, it does not intend to imply that every audit must include all of them or that such an extensive scope is always desirable. It is clearly stated that each element may be performed independently of the others.<sup>2</sup> No sequencing or progression is intended. Therefore, the nature and extent of government work that is done under the GAO standards and is called *audit* may vary considerably from engagement to engagement. This accentuates the importance of having a clear understanding of the scope of an engagement to which the GAO standards apply and the importance of having an engagement agreement as a medium for documenting this understanding. An audit requiring more than a financial audit will presumably require more time; it should provide greater benefits to the client but at additional cost.

All GAO audit elements were covered briefly in an initial AICPA report entitled *Auditing Standards Established by the GAO—Their Meaning and Significance for CPAs*, published in 1973. That report encourages accountants to participate in expanded audits but suggests that much additional work by the profession is needed concerning standards for evaluations of economy, efficiency, and program results. This publication considers in greater detail the "evaluation" aspects of expanded-scope audits as defined by the GAO. It also discusses the legal and regulatory requirements aspect of evaluations of efficiency and program results.

Some government entities and practitioners who are familiar with the management letters often accompanying financial audits equate the level of work in an expanded-scope audit to that

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<sup>2</sup> U.S. General Accounting Office, *Standards for Audit of Governmental Organizations, Programs, Activities & Functions* (Washington, D.C.: U.S. GAO, 1972), p. 2.

required to prepare management letters. This is not correct. Such letters are almost totally a by-product of the work required for the financial audit. The GAO has made it clear that its standards do not refer to such a by-product. Instead, a separate work program is required, one specifically designed to examine economy and efficiency or effectiveness (program results) and to produce findings, conclusions, and recommendations concerning them. Therefore, both the CPA and the client should understand that the engagement time and cost for an expanded-scope audit will exceed that required for a financial audit.

Woven throughout the GAO document on standards and its supplements are references to each aspect of government audits included in the GAO expanded-scope definition. Careful reading of these publications is recommended before a firm enters into any audit contract in which the GAO standards are cited. (See Bibliography in Appendix B.) Here, for convenience, are some of the salient as well as not-so-obvious points covered in the GAO standards.

The GAO defines the evaluation elements of an expanded-scope audit as follows:

*Economy and efficiency*—determines whether the entity is managing or utilizing its resources (personnel, property, space and so forth) in an economical and efficient manner and the causes of any inefficiencies or uneconomical practices, including inadequacies in management information systems, administrative procedures, or organizational structure.

*Program results*—determines whether the desired results or benefits are being achieved, whether the objectives established by the legislature or other authorizing body are being met, and whether the agency has considered alternatives which might yield desired results at a lower cost.<sup>3</sup>

Legal and regulatory requirements not related to the financial audit are identified as follows:

*Economy and efficiency*—The auditor is to make a review of the laws and regulations applying to any aspect of the audited organization, program, function, or activity in which he attempts to make a judgment regarding whether existing practices can be made significantly more efficient or economical. Such a review

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<sup>3</sup> Ibid.

is needed because determinations of how the entity's tasks can be accomplished more efficiently and economically cannot be done properly without an understanding of the purpose of the entity and what it is legally required to do. Such a review is needed also to provide the auditor with information on constraints on the entity's authority to change its practices to make them more efficient and economical.

*Program results*—The auditor is to review the laws and regulations pertaining to the goals and objectives of the audited entity's programs or activities in sufficient depth to gain a working understanding of the results that are expected from the programs or activities. He must also do sufficient testing to determine whether the programs or activities are being performed in conformity with applicable laws and regulations.<sup>4</sup>

In this document, the financial audit element will not be discussed. The document will discuss evaluations of economy, efficiency, and program results within an expanded-scope audit as defined by the GAO.

## **Evaluation of Economy and Efficiency**

In the text reproduced below, the GAO standards booklet identifies the general objectives of an evaluation of efficiency and economy.

A review of efficiency and economy shall include inquiry into whether, in carrying out its responsibilities, the audited entity is giving due consideration to conservation of its resources and minimum expenditures of effort. Examples of uneconomical practices or inefficiencies the auditor should be alert to include:

- a. Procedures, whether officially prescribed or merely followed, which are ineffective or more costly than justified.
- b. Duplication of effort by employees or between organizational units.
- c. Performance of work which serves little or no useful purpose.
- d. Inefficient or uneconomical use of equipment.
- e. Overstaffing in relation to work to be done.
- f. Faulty buying practices and accumulation of unneeded or excess quantities of property, materials, or supplies.
- g. Wasteful use of resources.<sup>5</sup>

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<sup>4</sup> Ibid., p. 30.

<sup>5</sup> Ibid., pp. 11-12.

In evaluating economy and efficiency, the practitioner should consider organization, policies, procedures, practices, and internal administrative controls relating to the aspects of the entity's operations being reviewed. However, an extensive review of all such matters would often be prohibitively expensive. The practitioner must use his judgment to concentrate his efforts on the problems which appear to have a significant impact in the area being evaluated. He should, for example, devote more of his time to 1) activities which incur high costs or 2) areas in which preliminary work has indicated that the operations are not being conducted efficiently or economically. While the practitioner should not devote extensive time to operations that appear to be satisfactory, neither should he ignore them. He should, for example, mention their existence in his report. This will provide evidence of the thoroughness of the review and, by providing balance with unsatisfactory findings, may lessen potential resistance to implementation of recommendations for remedial action.

The CPA is not expected to give an opinion on the overall level of efficiency and economy that an organization achieves in using its resources to carry out operations.

### **Evaluation of Program Results (Effectiveness)**

The purpose of such an evaluation is to determine whether the desired results or benefits are being achieved. Engagements of this kind often appear to be much simpler than they are in fact.

Frequently, in government activities, program objectives and measurement criteria are not clearly specified. Until the objectives have been identified and documented, an evaluation cannot be meaningful. However, the GAO anticipates that in cases where this has not been done prior to the evaluation engagement, the CPA may be called upon to counsel with management to 1) place program objectives in writing, 2) establish, where possible, valid measures, and 3) develop the methods for accumulating the information necessary to measure progress in achieving these results.<sup>6</sup> An engagement requiring such services can be far more extensive than may at first be apparent.

Prior to submitting a proposal for an engagement, the CPA should attempt to ascertain the extent to which it may be necessary

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<sup>6</sup> U.S. General Accounting Office, Audit Standards Series Supplement No. 5, *Questions and Answers on the Standards for Audit of Governmental Organizations, Programs, Activities & Functions* (Washington, D.C.: U.S. GAO, 1974), p. 15.

to counsel with management in the areas described above. He may decide not to submit a proposal if he concludes that he lacks appropriate expertise or believes it would not be practical to satisfactorily define goals, establish measures, and so forth. If he does plan to counsel with management in these areas, this must be considered in establishing the engagement scope and procedures.

The GAO describes an evaluation of program results in terms as broad as those used for an evaluation of efficiency and economy. It includes a review of operations, policies, practices, controls, and compliance requirements that have a specific bearing on the attainment of program goals and objectives.<sup>7</sup> The practitioner should perform whatever reviews are required to properly assess reported program results, keeping in mind that the primary assessment of program results is the continuing responsibility of the entity's management.

Ideally, the practitioner would only be required to examine the reported data by evaluating the criteria, the data-gathering process, and the data which formed a basis for management's report in order to determine if the report is reasonable and appropriate. He would not render a standard accountant's report containing an opinion such as is required in a financial audit. Rather, he would report on specific findings concerning management's report of program results and the data gathering and analysis it involved. In addition, when possible, the practitioner would make recommendations for improving program effectiveness based on his observations in the course of evaluating management's reports.

While the foregoing points represent the ideal situation in an engagement to evaluate program results, often there are cases where management has not made a usable assessment of program results or does not have the data necessary to do so. The CPA may be asked to develop an independent assessment.<sup>8</sup> Before preparing an engagement proposal, therefore, it should be ascertained whether management has developed reports specifying the program results and assessing the factors affecting the success or failure in achieving desired results. If not, the CPA can then consider whether, and under what conditions, he will undertake such work.

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<sup>7</sup> U.S. General Accounting Office, *Standards for Audit of Governmental Organizations, Programs, Activities & Functions* (Washington, D.C.: U.S. GAO, 1972), p. 34.

<sup>8</sup> *Ibid.*, p. 12.



## **Legal and Regulatory Requirements**

This publication considers legal and regulatory requirements for evaluations of economy, efficiency, and program results, but not those that relate to the financial audit element.

Legal and regulatory requirements reviews in other than the financial audit areas may require extensive data gathering and can be time consuming and expensive. A substantial part of the work required to identify the applicable laws and regulations should be done by the organization requesting the evaluation, thus limiting the practitioner's involvement to the exercise of professional judgment in gathering and testing the related data. In practice, the organization may not provide the data on applicable laws and regulations. In such instances, the engagement agreement should specify the CPA's approach. If the effort will be extensive, the CPA should provide sufficient time in the work plan. Legal assistance may be required or advisable.

## **Practitioner's Qualifications**

The CPA should keep in mind the following significant distinction between financial auditing and engagements to evaluate efficiency, economy, and program results. While there are some variations encountered in conducting financial audits, a practitioner skilled in examining accounting records, financial statements, and internal controls should encounter few material differences in the skills and knowledge required of him when moving from one government entity to another. This is not true for evaluations of economy, efficiency, and effectiveness. While he will apply the same analytical approach, the nature of the problems encountered and the knowledge and skills that may be required will be no less diverse than the goals and activities of the federal, state, or local government entities to be audited.

The GAO's second general standard for government auditing states that "The auditors assigned to perform the audit must collectively possess adequate professional proficiency for the tasks required."<sup>9</sup> The GAO's text on this standard describes such professional proficiency:

Requirements for staffs performing government audits are:

1. A basic knowledge of auditing theory and procedures and the education, ability, and experience to apply such knowl-

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<sup>9</sup> Ibid., p. 13.

- edge to the type of auditing work required for the task at hand.
2. A basic knowledge of governmental organization and operation. This knowledge may be acquired by appropriate education, study, or experience.
  3. Skills appropriate for the work required in the audit. For auditing financial reports which lead to an opinion, the auditor must be proficient in accounting. . . . For other types of auditing work, the skills of the auditors must be appropriate for the work to be done. For instance:
    - a. If the work requires use of statistical techniques, the audit staff must include persons having the appropriate statistical skills. These skills may be possessed by staff members or by consultants to the staff.
    - b. If the work requires extensive review of computerized systems, the audit staff must include persons having the appropriate computer skills. These skills may be possessed by staff members or by consultants to the staff.
    - c. If the work involves review into complex engineering data, the audit staff must include persons having the appropriate engineering skills. These skills may be possessed by staff members or by consultants to the staff.<sup>10</sup>

The GAO's examples could readily have included skills or knowledge related to sociology, psychology, medicine, transportation, public safety, judicial processes, sanitation, and so forth. Public accounting firms may often have to supplement their staffs to fulfill these requirements. In considering their qualifications for a particular engagement, CPAs should be aware that in certain cases cooperative engagements with other professionals could provide the needed expertise if it is not available within their own firm.<sup>11</sup>

In the event that a cooperative engagement is undertaken, however, the practitioner should be familiar with the nature of responsibilities that may be involved. For example, MAS Guideline Series No. 5, *Guidelines for Cooperative Management Advisory Services Engagements*, cites the following concerning the issuance of proposals and reports:

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<sup>10</sup> Ibid., pp. 13-14.

<sup>11</sup> American Institute of Certified Public Accountants, Statement on Auditing Standards No. 11, *Using the Work of a Specialist*, December 1975 and MAS Guideline Series No. 5, *Guidelines for Cooperative Management Advisory Services Engagements*, 1976 (New York: AICPA).

Proposals and reports will typically be issued in one of the following manners:

1. *The practitioner issues the proposal or report*, assuming full responsibility for the work of other participants. This is appropriate when the CPA is the prime contractor and is competent to evaluate other participants' work.
2. *The practitioner issues the proposal or report specifically identifying those aspects of the engagement for which he is relying on other participants as experts.* This is appropriate when the CPA is the prime contractor.
3. *Another participant issues the proposal or report*, either assuming full responsibility for the practitioner's work or identifying those aspects of the engagement for which he is relying on the practitioner. This is appropriate when the practitioner is a subcontractor.
4. *A joint proposal or report is issued* by participants, with each participant's scope of work clearly defined. This could be appropriate where the involvement of each participant is significant.
5. *Separate proposals or reports are issued.* This is appropriate (a) for proposals or reports involving cooperative participation without a contractual relationship among participants, (b) when separate reports appear desirable and are acceptable to the client, or (c) when separate reports are requested by the client.

For all engagements in which the client is aware of a practitioner's participation, the practitioner should retain and exercise his right to review the proposal and any subsequent presentation of his findings and conclusions.<sup>12</sup>

## Summary

The material covered in this chapter should provide a clearer understanding of the nature of expanded-scope government audits and of the knowledge and qualifications which CPA firms and practitioners should possess or acquire in undertaking this kind of engagement. The GAO's requirements for an evaluation of economy, efficiency, or program results, as the quotes from the standards booklet testify, call upon practitioners to consider many

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<sup>12</sup> American Institute of Certified Public Accountants, MAS Guideline Series No. 5, pp. 5-6.

things during an expanded-scope audit that have not previously been a matter of concern except in providing management advisory services, or in operational auditing.<sup>13</sup>

Therefore, before undertaking an expanded-scope audit as defined by the GAO, the CPA must assess his own capabilities in terms of what will be required.

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<sup>13</sup> Operational auditing is a term generally used to refer to a method of reviewing or appraising the effectiveness or efficiency of various operations and operating procedures; a technique for assuring management that its aims are being carried out and identifying conditions that can be improved.

## **Chapter 2**

# **Responding to a Government Request for Proposal (RFP)**

For the CPA about to respond to a government request for a proposal involving an evaluation of economy, efficiency, or program results, these elements of expanded-scope government audits as defined by the GAO will require serious consideration. Even those experienced with similar evaluation reviews in the private sector through their MAS practices will need to consider the effects the requirements will have on their government audit proposals in terms of factors such as work plans and estimated manpower and time requirements.

The purpose of this chapter is to assist CPAs in responding to government requests to submit proposals for expanded-scope audits. A brief explanation of the procedure generally followed by government entities to secure proposals and select an auditor follows.

A request for proposal (RFP) is a government's method of assuring the required competition for government business—in this case an audit that may or may not include evaluation elements. While the format of an RFP may vary widely, it usually states problems, goals, and objectives, may provide some specifications on scope, methodology, and data sources, and generally asks for the respondents' qualifications and proposed approach. The RFPs for federal government engagements will frequently be highly formal both in nature and in the procedures followed. RFPs from local governments may take the form of simple letters involving few formal procedures, or they may be as complex as federal government RFPs. Usually, any CPA aware of the issuance of an RFP may secure a copy and respond, though in some cases there may be certain restrictions. A formal RFP will indicate the nature of the work to be performed and administrative matters concerning both the submission of the proposal and the conduct of the engagement.

Sometimes, the work statement for an audit—particularly at local levels—may not be sufficiently detailed, and may state only that it involves “performing an audit in accordance with the GAO standards.” In such cases, the CPA should obtain clarification of the work required before submitting a proposal. Often there are official conferences where potential respondents may raise such questions. Ideally these conferences will supply answers or alert the CPA to possible problems. Without clarifications, a CPA could submit a proposal for all elements of an expanded-scope audit as defined by the GAO when the issuing entity only desires a financial audit, or vice-versa. The GAO standards do not mandate performance of all elements, but many government entities are adopting the expanded-scope audit concept. Both the CPA and the entity requesting the audit proposal should be clear as to what work is required if the proposals are to be responsive and competitive.

Since government proposals are often more formal than those used in the private sector, a CPA should adhere to the content and format specifications in the RFP to assure that his proposal will not be rejected for technicalities. Further, a proposal based solely on a subjective interpretation of a vague RFP may be rejected as not responsive to the requester’s needs.

A proposal should be as specific as possible, not only as to scope, objectives, work program, and fee, but also as to billing, reporting, staffing, and other pertinent matters. It may be extremely difficult to modify or change conditions of a proposal once it has been accepted.

## **Pre-Engagement Checklist**

The following checklist for expanded-scope audits involving an evaluation of economy, efficiency, or program results has been prepared to (1) assist CPAs in understanding the nature of each potential engagement, (2) guide those who issue RFPs in providing the desired information, and (3) aid the CPA in structuring a proposal and work program.

The checklist contains a series of questions which fall into four broad categories—

*Engagement Environment.* The professional relationship between the CPA and the government entity to be evaluated.

*Economy and Efficiency.* Elements of the engagement that will affect the CPA’s proposal.

*Program Results.* Elements of the engagement that will affect the CPA's proposal.

*Professional Proficiency.* The CPA's qualifications to undertake a specific engagement.

### **Pre-Engagement Checklist**

#### *Engagement Environment*

1. Who is requesting the evaluation?
2. What motivated the request?
3. Will the requester or recipient be able to implement the report recommendations?
4. Are engagement objectives and scope of work well defined and attainable?
5. Does the scope entail a constructive piece of work?
6. Is sufficient time allotted for the CPA to complete the engagement?
7. Will the applicable laws and regulations be specified in the engagement agreement?
8. Will the criteria for selecting an independent firm be based on competence as well as on price?

#### *Economy and Efficiency*

1. Is there agreement between the CPA and requester on which areas are to be reviewed (e.g., programs, departments, activities, or projects)?
2. Is there a clear understanding of which functional areas are to be reviewed (e.g., personnel utilization, data processing, procurement, financial management, warehousing, inventory management, and so forth)?
3. Have there been prior reviews (internal or external) of the same area?
4. Were any actions taken as a result of prior reviews?
5. Will prior reviews be made available to the CPA?
6. Has the requester specified any existing data and reports which may be accepted as reliable without further verification?
7. To what extent does the work to be studied lend itself to measurement?
8. Have criteria for measuring economy and efficiency been established (e.g., does the entity have existing productivity standards)?
9. Have the data related to the established criteria been accumulated?

10. Will the data be available to the CPA?
11. Is routine reporting of productivity a current or feasible practice?
12. To what extent are cost data available?

#### *Program Results*

1. Are there well-defined program objectives?
2. Are there reasonably well-defined timetables for achieving program objectives?
3. Have criteria been established for evaluating program results?
4. Are the criteria quantifiable, or at least measurable, and to what extent can the results be measured objectively?
5. Have the data related to the established criteria been accumulated?
6. Will the data be available to the CPA?
7. Has management prepared a current assessment of the program's results?
8. Have there been any previous external evaluations of the program?
9. Were any actions taken as a result of previous evaluations?
10. Will previous evaluations be made available to the CPA?

#### *Professional Proficiency*

1. Is the CPA familiar with the government environment (e.g., source of funding, related agencies, potential publicity, potential subsequent reviews, and so forth)?
2. Does the CPA understand the scope of the engagement?
3. Does the CPA possess or have access to technical skills required to review and evaluate the specific functional areas involved?
4. Does the CPA understand the specific government program and have access to the specific skills needed to evaluate the program results?



## Chapter 3

# Conducting Evaluations of Economy, Efficiency, and Program Results

The evaluation elements of an expanded-scope government audit, as defined by the GAO, call upon the practitioner to utilize a variety of skills and to utilize audit procedures which typically are not required in the examination of financial statements. In financial audits, a CPA follows generally accepted accounting principles and generally accepted auditing standards. No generally accepted standards for evaluations of economy, efficiency, and effectiveness have been adopted by the AICPA.

The purpose of this chapter is to provide some guidance by indicating the analytical approach which many practitioners consider basic to the conduct of this kind of engagement and by pointing out certain constraints in the conduct of such engagements.

## The Analytical Approach

The conduct of the evaluation elements of an expanded-scope government audit entails an analytical approach and process similar to that used in operational audits and in many management advisory services engagements. Typically, this will involve the following steps:

1. Ascertaining the pertinent facts and circumstances.
2. Seeking and identifying objectives.
3. Defining problem areas or opportunities for improvement.
4. Evaluating and determining possible improvements.
5. Presenting findings and recommendations.<sup>14</sup>

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<sup>14</sup> Compare with *Statements on Management Advisory Services* (New York: AICPA, 1974), p. 22.

Carrying out these steps calls for appropriate use of procedures generally followed in operational or management audits. Such procedures and activities would often include but not necessarily be limited to the following:

- Interviewing key personnel at all organizational levels, as well as users or “customers” of a program.
- Observing, documenting (including flow charting), reviewing and analyzing operations, data-collection systems, and the flow of transactions.
- Testing transactions and other data.
- Reviewing organization charts, policy statements, procedure manuals, performance standards, past performance data, applicable laws, and other pertinent data.
- Reviewing and documenting current staffing, equipment, forms, and reports.
- Reviewing internal management’s reports, internal and independent audits, other consultants’ reports, management letters, and so forth.
- Reviewing budgets, purchases, supply utilization, and cash management.
- Analyzing findings to pinpoint problems and weaknesses.
- Developing recommendations to solve problems and overcome weaknesses.

## Evaluation and Measurement Criteria

In its discussion of the expanded-scope audit elements, as defined by the GAO, the AICPA’s 1973 publication, *Auditing Standards Established by the GAO—Their Meaning and Significance for CPAs*, stressed that evaluation and measurement criteria are essential for the conduct of economy, efficiency, and effectiveness reviews. It stated that the profession should continue to define standards for performing such evaluations.<sup>15</sup>

This publication is a step in that direction. It is primarily concerned with the conduct of evaluation engagements. It does not undertake to provide the evaluation and measurement criteria that are essential to the successful performance of such work.

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<sup>15</sup> American Institute of Certified Public Accountants, *Auditing Standards Established by the GAO—Their Meaning and Significance for CPAs* (New York: AICPA, 1973), p. 11.

It appears unlikely that criteria will be documented that can be applied in all situations because of the diversity of government operations and program goals. This makes it essential that the practitioner use professional judgment as to the appropriateness of the criteria used in a specific engagement. Sources for such criteria include legislative language; agency standards, policies and procedures; responsible agency management personnel; contractual terms; previous experience with similar activities; and authoritative publications on the subject. The use of documentable standards, measures, and criteria will give the CPA's report a more authoritative foundation that should aid in its acceptance. Where acceptable criteria cannot be determined and agreed upon, it may be necessary to postpone an evaluation until this key matter is resolved.

The CPA should not place himself in a position to unilaterally establish objectives, standards, criteria, or measurement methods. However, he may agree to counsel with management in order to develop what is needed. Depending upon the magnitude of the pre-evaluation work, the CPA may choose not to undertake the evaluation engagement at all or to supply such advice prior to the evaluation only after negotiating an extension of the scope of the engagement. He may also propose a separate consulting engagement, aimed specifically at establishing objectives, standards, criteria, or measurement methods before conducting an evaluation. These decisions should be made before accepting a government contract, as it may prove impossible to make such changes afterward.

While published material which could help a practitioner to recognize appropriate evaluation and measurement criteria is limited, there is some available. The GAO, in conjunction with the Office of Management and Budget and the Civil Service Commission, has published the results of a 1973 study aimed at establishing a permanent measurement system for federal entities. It appeared as a two-volume report entitled *The Permanent Measurement System—Methods, Measures, Results*. Volume 1 includes descriptions of overall government entities. The report presents a broad-gauge system which would have very limited use in a specific evaluation engagement. However, it does provide useful background information. Another report of interest is "Measuring Effectiveness of Municipal Services," by Robert H. Davis, which appeared in the August 1970 edition of *Management Information Service*, a publication of the International City Management Association. It includes over three hundred specific measures of efficiency and effectiveness for municipal functions and also con-

tains material on how such criteria may be developed. Many of the theoretical measures cited have been improved in practice since 1970. The article, however, still provides valuable illustrations in a subject area where little currently appears in print.

In February 1974 The Urban Institute and International City Management Association (ICMA) published an initial report on *Measuring the Effectiveness of Basic Municipal Services*, which deals with means for gathering and evaluating effectiveness data on the municipal level. Suggestions are given for effectiveness measures for solid waste collection and disposal, recreation services, local transportation services, water supply service, wastewater treatment, storm drainage and water quality preservation services, and the handling of citizens' complaints and requests for servicing and information.

Another useful reference concerning the effectiveness and efficiency of social programs is an annotated bibliography prepared by the National Planning Association under contract to the National Science Foundation entitled *The Policy Analysis Source Book for Social Programs*. This two-volume, 1,200 page document includes such programs as health, housing, education, income maintenance, transportation, social services, energy, and environmental protection. It is available through the U.S. Government Printing Office.

The Urban Institute and ICMA continue to be in the forefront in developing efficiency and effectiveness measures for basic services. Practitioners who perform these evaluations will find their publications to be useful. To illustrate the nature of these criteria, an extensive list of efficiency and effectiveness measures for solid waste collection activities is reproduced in Figure 1, pages 23-26.

Figure 1

## Application of Measures to Solid Waste Collection Activities

(Urban Institute and ICMA)

Measures	Activities						
	Residential Collections	Commercial Collections	Street Cleaning	Leaf Removal	Brush Removal	Special Collections	Abandoned Auto Removal
<b>Efficiency</b>							
1. Tons collected per \$1,000 or dollars per ton collected (efficiency reciprocal)	X	X	X	X	X	X	
2. Tons collected per man-hour	X	X	X	X	X	X	
3. Households served per \$1,000 or dollars per household served (efficiency reciprocal)	X				X	X	
4. Households served per man-hour	X				X	X	
5. Commercial establishments served per \$1,000 or dollars per commercial establishment served		X					
6. Commercial establishments served per man-hour		X					
7. Items removed per \$1,000 or dollars per item removed						X	X
8. Items removed per man-day						X	X
9. Lane miles cleaned per \$1,000 or dollars per lane-mile cleaned			X	X			
10. Lane miles cleaned per man-day			X	X			
<b>Effectiveness</b>							
1. Percentage of residents reporting no spillage	X						

**Figure 1 (cont.)**

## Application of Measures to Solid Waste Collection Activities

(Urban Institute and ICMA)

Measures	Activities						
	Residential Collections	Commercial Collections	Street Cleaning	Leaf Removal	Brush Removal	Special Collections	Abandoned Auto Removal
Effectiveness (continued)							
2. Percentage of residents reporting collection noise level acceptable	X				X	X	
3. Percentage of residents reporting no significant damage to private property due to collection activities	X		X	X	X	X	X
4. Percentage of residents reporting no missed collections	X				X	X	
5. Percentage of commercial establishments reporting no spoilage		X					
6. Percentage of commercial establishments reporting no damage to private property due to collection activities		X					
7. Percentage of commercial establishments reporting no missed collections		X					
8. Percentage of cleaned streets with a postcleanliness rating of 1.0			X	X			
9. Percentage of citizens reporting no objectionable street-cleaning noise			X	X			
10. Percentage of collection routes completed on schedule	X	X	X	X	X	X	

## Application of Measures to Solid Waste Collection Activities

(Urban Institute and ICMA)

Measures	Activities						
	Residential Collections	Commercial Collections	Street Cleaning	Leaf Removal	Brush Removal	Special Collections	Abandoned Auto Removal
Effectiveness (continued)							
11. Percentage of calls for special collection pickups responded to within X days or less (for on-demand type services)						X	
12. Percentage of abandoned autos removed within X days or less after receipt of report							X
13. Percentage of households reporting having seen rats on their block in the past year	X	X	X		X		
14. Number of rodent bites reported per 1,000 residents	X	X	X		X		
15. Percentage of blocks with one or more fire hazards	X	X	X	X	X		X
16. Number of fires involving uncollected solid waste	X	X	X	X	X		X
17. Percentage of blocks with one or more safety hazards			X			X	
18. Percentage of blocks whose appearance is rated satisfactory (2.0 or better on visual rating scale)	X	X	X	X	X		
19. Average block cleanliness rating	X	X	X	X	X		
20. Percentage of households rating overall neighborhood cleanliness as satisfactory	X	X	X	X	X		

**Figure 1** (cont.)

## Application of Measures to Solid Waste Collection Activities

(Urban Institute and ICMA)

Measures	Activities						
	Residential Collections	Commercial Collections	Street Cleaning	Leaf Removal	Brush Removal	Special Collections	Abandoned Auto Removal
Effectiveness (continued)							
21. Percentage of households not reporting offensive refuse-related odors	X	X	X				
22. Percentage of blocks with abandoned automobiles							X



## Illustrative Approaches to the Evaluation of Economy and Efficiency

The material that follows is intended to provide guidance in the development of work programs and work steps for economy and efficiency evaluations being conducted in accordance with GAO standards. Such guidance, however, must be of a general nature, because GAO standards are general standards and do not attempt to specify the level of detail at which any particular evaluation engagement should be performed. The standards were issued for the benefit of government audit agencies and other interested groups including public accounting firms. Government audit agencies can pursue economy and efficiency in all operations to whatever degree available time and budget will permit. For the CPA, however, an evaluation of economy and efficiency in which the level of detail is not specified might entail a very wide range of fees (a few thousand to several hundred thousand dollars) depending upon the breadth and depth of the study.

Obviously, the entity requesting the evaluation and the CPA should agree on both scope and level of detail before the proposal is submitted. The only available guide to what the GAO might consider an appropriate level of detail is the GAO's Audit Standards Supplement Series No. 6, *Air Pollution Control Program, Sassafras County, Maryland*. This is an illustrative report on all elements of an expanded-scope audit as defined by the GAO.

The report indicates that an audit conducted in accordance with the GAO standards should be responsive to the audit guide issued by the federal agency responsible for the entity's program.<sup>18</sup> While more audit guides that include reviews of economy, efficiency, and program results will be prepared, few exist at this time.

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<sup>18</sup> U.S. General Accounting Office, Audit Standards Supplement Series No. 6, *Air Pollution Control Program, Sassafras County, Maryland* (Washington, D.C.: U.S. GAO, 1975), p. iii.

A simulated audit guide for the Sassafras County study is incorporated as an appendix to the illustrative report. This example of an expanded-scope audit report, and the audit guide on which it was based, is reproduced in Appendix A of this publication. It is an illustration of what was done—and was acceptable—in one situation. However, some expanded-scope audit requests might demand much more depth than was required in the Sassafras County study.

Like the illustrative report, most government audits are concerned with a specific unit or a program it is charged with carrying out at the federal, local, or grantee level. An engagement will often be structured along organizational lines, involving, for example, specific activities within police, fire, public works, or recreational departments, or specific programs within such departments.

When a study is directed toward a specific organization or program, the practitioner should expect to encounter some services which are performed centrally for several units. Normally, a detailed study of these central services departments would not be undertaken as part of a specific unit's review unless it is incorporated into the contract initially or as an amendment.

Illustrations of reviews of unique activities are of limited assistance to practitioners reviewing other kinds of activities. However, many audited entities will have common operational aspects regardless of the activities or goals involved. By choosing two such aspects—data processing and personnel utilization—this publication illustrates the potential depth of an evaluation of economy and efficiency in areas that practitioners may expect to encounter in expanded-scope audits as defined by the GAO. The depth of the CPA's review in specific engagements, however, must be a matter of his professional judgment of what is requested and the resultant cost/benefit considerations.

The following two illustrations, which are not intended to be used as evaluation checklists, illustrate the depth in which practitioners might investigate certain areas, if required. In the long run they may also encourage greater consistency of approach (not depth) in conducting evaluations of data processing and personnel utilization.

In some situations, a CPA may be asked to review a limited area, for example, the data-processing installation in a city's public safety department. His report must emphasize the limited scope of his study so that his findings will not be interpreted as covering a broader area. Even so, the practitioner should consider how the limited area relates to the overall activity of which it is a part in order to place his findings in a proper frame of reference.

## **Illustrative Approach for Evaluation of Data Processing**

Computer installations have differing objectives and operating requirements, and not all installations will have the same problems. The purpose of the following illustration is to provide general guidance to the practitioner in developing a work program. The scope and depth of review required for any particular engagement must be determined on the basis of the applicable audit guide (if any) and the understandings documented in the engagement agreement.

In the initial planning for the evaluation of any data-processing activity's operational economy and efficiency, four major areas of inquiry should be considered:

Computer outputs

Organizational alignment and managerial functions

Information systems

Technical competence

Each of these potential review areas is discussed below.

### **Confirming That Computer Outputs Are Needed**

A computer may sometimes be used to perform unnecessary work or work which should be done some other way. The practitioner should first discern if the entity is following formalized procedures for reviewing existing outputs. The review procedure for each output should answer the following questions:

- How is the report or other output used?
- Should it be eliminated?
- Should the computer be used to prepare it?
- Should it be replaced by some other existing report?
- Should it be replaced by combining it with another report or modifying another report?
- Should the information content be changed?
- Should the preparation frequency be changed?
- Should the number of copies be changed?

If the entity is not reviewing the need for its computer outputs, the practitioner should consider (a) recommending institution of such procedures and (b) conducting suitable inquiries on a sample basis. Ascertaining whether users have been trained in the capabilities of the reporting system is a related aspect of evaluating the efficient use of computer outputs.

## **Determining the Efficiency of Organizational Alignment and Managerial Functions**

Efficient data-processing operations cannot be separated from effective management of the computer center. Therefore, in his work plan the practitioner should consider including a review of the following points:

1. Is the data-processing function properly placed organizationally to provide effective service to the entire organization, and is it permitted to serve the entire organization?
2. Are there adequate descriptions of the duties and responsibilities of the key members of the data-processing organization?
3. Are appropriate information, techniques, and processes being used to manage and control the data-processing operations?
  - Are there stated goals and objectives?
  - Is there a long-range plan?
  - Are there adequate project controls and check points?
  - Does the installation have a formal reporting system which identifies work accomplished compared to work planned, problem areas, reruns, machine utilization and downtime, setup time, idle time, timeliness of providing products to users, and actual costs compared to plan?
  - Does the installation have and use written operating instructions covering physical security of data files and access to data, contingency procedures in the event of equipment failure and major disaster, operations manuals or run books, and other computer room procedures?

## **Determining the Efficiency of Information Systems Operations**

Many outputs from early-generation computers were the result of simply converting punch card systems so that they could function on newer, faster computer equipment. In many instances little has been done to redesign existing systems to take advantage of advanced features of the computers subsequently installed. In such instances, productivity may be low and operating costs higher than necessary, and service to users may be less than optimum. At the other extreme, systems sometimes have been designed to take advantage of the capabilities of high-level computer and communication technology and may be far more sophisticated and costly than needed to meet information requirements. In other cases, existing systems do not include adequate controls over data

entry, processing, and reporting operations, resulting in the production of erroneous information and excessive computer reruns.

To respond to such situations, the practitioner should consider reviewing the extent to which an entity's information systems are designed for efficient operations by examining systems documentation and interviewing data-processing personnel and users. Such a review would seek to determine whether systems (1) are designed to exploit fully the capability of the computers installed, (2) designed to satisfy actual requirements of the user, or primarily to justify acquiring more sophisticated computer and communications equipment, and (3) include data and program controls to assure accurate input and processing of data and reporting of information.

The practitioner should question whether the entity's approach to designing and installing information systems is sound and efficient. He should also determine whether the data-processing installation has adopted design and programming standards. Some examples of what might be included in such standards are statements concerning:

- Separation of the systems development effort into logical segments such as feasibility study, preliminary systems design, detailed design, programming, conversion preparation, systems testing, and conversion.
- Documentation of information requirements, program specifications, programs, manual procedures, and so forth.

If a review of this aspect of a data-processing operation is conducted, identification of system or application programs with performance problems should be included in the practitioner's report. Some specific means the practitioner could use to determine this are as follows:

- The portion of the computer's operating system that records the resources used in processing application programs will show the amount of storage, CPU time, and input/output resources each program uses. Comparison of those records with the estimates made for the programs prior to installation will often pinpoint problem programs.
- Computer operators are frequently able to provide insight into opportunities for improving application programs. For example, excessive reruns for a given application may be attributable to the absence of a restart capability in the program.
- Software and hardware monitors can be useful in spotting inefficiencies in specific application programs and in computer equipment configurations.

## **Determining Whether Technical Competence Is Adequate**

Efficiency in system development and operations and responsiveness to user requirements are dependent upon the technical and managerial competence of data-processing personnel. Therefore, in the performance of his evaluation of any data-processing operation, the practitioner should consider the competence of data-processing personnel. In addition, he should determine whether data-processing personnel participate in continuing education and training programs so that they can maintain or improve their skills.

## **Illustrative Approach to the Evaluation of Personnel Utilization**

People are the universal resource that organizations must manage. The quantity and quality of personnel and the way in which they are managed will have a tremendous impact both on economy of operation (cost) and efficiency of operation (level of service).

The diversity of government operations is extremely broad and inclusive. The purpose of the following illustration is to alert the practitioner to the many facets of personnel utilization that could be reviewed in an engagement to evaluate economy and efficiency. The scope and depth of review required for each engagement must be determined on the basis of the applicable audit guide (if any) and the understandings documented in the engagement agreement.

In developing a work program for an evaluation of the economy and efficiency of the use of personnel, four potential areas of inquiry should be considered

*The goals and objectives* toward which the personnel are working and their understanding of them.

*The organizational structure* within which the personnel function and the interrelationships with other units, entities, functions, and programs.

*The nature of the work* being performed, the systems and procedures in use, the equipment involved, and the capabilities of individuals to perform satisfactorily in their assigned duties.

*The managerial controls* being exercised.

The following discussion of these aspects should facilitate the practitioner's decision on whether and how deeply he should review each of them.

### **Goals and Objectives**

Goals and objectives may be defined by legislative enactment, departmental criteria, or other recognized authorities. They pro-

vide formal statements of broad intent as well as establishing the desired or expected accomplishments. They provide a means for measuring the degree of progress.

In order to set a firm foundation for an evaluation of personnel utilization, the practitioner would conduct a review along these lines of inquiry:

- What is the nature of the entity, unit, function, or program concerned?
- Does it have documented or readily definable objectives?
- Are the goals and objectives understood by the personnel involved?
- What assignments and standards have been set for the personnel involved?

### **Organization Structure**

Organization can be defined as a long-term association created and maintained to attain certain objectives and to perform a particular mission. The structure of an organization is a formal expression of that systematic arrangement. It describes relationships among the parts of the organization and among the people who are members.

All organizations should begin with goals and objectives that are recognized and expressed; personnel assignments should contribute to the achievement of those goals and objectives.

The organization structure and its relationship to goals, objectives, and activities could be reviewed as follows:

- Are lines of authority and responsibility clearly delineated to assure the proper flow from supervisory authorities to subordinates?
- Are personnel positions properly designed, documented, and compensated?
- Are personnel policies and practices documented and followed?
- Are supervisory assignments appropriate for the nature and structure of the work performed?
- Are there laws, regulations, or union contracts that affect the utilization of personnel?

### **Nature of the Work**

A key to evaluating the effective utilization of personnel lies in the nature of the work the personnel are required to do and how

they are going about it. To facilitate the practitioner's decision as to the depth of review required, the "walk-through" (physical observation) is a useful initial method of observing productivity, general working conditions, housekeeping, storage, security, and other pertinent matters.

The practitioner, in order to understand problems relating to the work done by the personnel, could then review the following:

- Is the work being done necessary or have "make-work" practices and other nonessential work operations become part of the activities?
- Is the work duplicated elsewhere, or can it be combined with related activities for greater efficiency?
- Are all current positions necessary to do the work performed or should they be realigned or regrouped for more efficient operations?
- Are the systems and procedures being followed producing adequate results and are they documented to facilitate training?
- Are the personnel properly trained and instructed in their tasks?
- Do the personnel assigned to specific tasks have the appropriate level of skill?
- Do the line managers retain responsibility for using effective methods and procedures or do they believe staff is responsible for this?

### **Managerial Control**

Management of personnel includes recruiting, employing and retaining essential manpower as well as achieving operational economy and efficiency. Leadership and guidance is necessary, along with a clear assignment of responsibilities. The management team must monitor work performance to achieve the best results. In achieving economic and efficient utilization of personnel, managers have five principal responsibilities: planning, organizing, directing, coordinating, and controlling. The practitioner could include the following in his review of this aspect of personnel utilization:

- Is management reviewing the performance information necessary to exercise proper control, such as overall work counts, individual or unit productivity data, machine-downtime data, processing-time data, premium-time records, and data on absences and vacancies?



- Have performance standards been established and are they being adhered to? Is the work suitable for work measurement or similar techniques?
- Are error ratios higher than acceptable for economic and efficient performance? Is the work suitable for quality control techniques?
- Are work outputs produced in a timely manner? Is the work suitable for scheduling techniques?
- Are personnel costs in excess of the authorized or budgeted amounts? Is the situation suitable for budgetary or cost-control techniques?

## **Audit Guides Establish Level of Detail**

The CPA should obtain any applicable audit guide before preparing a work program. When working at a state or local level, he should follow the funding flow to the source to determine whether there is an applicable audit guide. Assistance can usually be obtained by contacting the agency or department administrator for the region in which the engagement will be conducted or the office of audit of the appropriate agency or department in Washington, D.C. When an audit guide does not exist, or does not cover all aspects of an expanded-scope audit as defined by the GAO, the CPA should document the planned scope and level of detail for the engagement and have all parties concur before beginning work.

The GAO's Illustrative Report Air Pollution Control Program, Sassafras County, Maryland, (Appendix A) is an example of a report on an expanded-scope audit under GAO standards. However, since it was prepared for government audit agencies as well as CPAs, it may not comply in all respects to the standards under which a CPA would report. While it includes a report of the work done in response to the economy and efficiency evaluation section of a simulated audit guide, the illustrative approaches in this chapter, for evaluations of economy and efficiency in data processing and personnel utilization, are perhaps more suggestive of the depth to which such studies might be carried if so indicated in an RFP or audit guide.

## **Chapter 5**

# **Program Results Evaluation**

Government programs are activities or groups of activities undertaken by an entity or agency to provide a service to the public. Program results evaluation engagements will frequently concern specific activities related to:

- Health and safety
- Education
- Transportation
- Public safety (police and fire services)
- Sanitation
- Housing
- Utilities
- Environment
- Agriculture
- Economic opportunity and employment
- Recreation
- Culture (libraries and museums)

Local funding for these activities often includes federal or state funds, and evaluations of program results may increasingly be required.

In evaluating government program results, the practitioner must be guided by the legislative intent. In many cases, detailed rules and regulations for program evaluations, including objectives, standards, and measurement criteria, have been established by individual federal agencies. These are “exposed” in the Federal Register and then become a part of the code of federal regulations. The practitioner should assure himself that the conduct of the program does not overlook or conflict with the legislative language. Legal assistance can be helpful.

## Purpose of Program Results Evaluation

Government program planners and policymakers must continually make judgments about the value of ongoing programs in order to allocate resources effectively. When a CPA is engaged to evaluate program results, however, it is not intended that it include an evaluation of the worth of the program or the advisability of its continuation. The practitioner's purpose in reviewing the program is to determine the following:

### *Objectives*

Are the program's objectives (as established by the legislature or other authorizing body) being accomplished in terms of measurable results?

### *Assessment*

Is the current assessment of achievement, as reported by program management, valid? Are the evaluation criteria meaningful? Are the measurement methods appropriate? Are the data accurate?

### *Alternatives*

Have alternatives been considered by the entity which might produce the desired results at a lower cost?<sup>17</sup>

These three major points of program results evaluation are discussed below.

## **Objectives**

The Urban Institute in Washington, D.C. has done considerable research on the evolving nature of program results evaluation and has published a number of valuable books. In *Federal Evaluation Policy* by Joseph S. Wholey et al. (1973), evaluation is described as an activity designed to assess the effectiveness of an ongoing program in achieving its objectives, distinguish between a program's effects and other causal factors, and improve results through modification of current operations.<sup>18</sup>

The primary focus in this element of an expanded-scope audit as defined by the GAO is clearly to evaluate the program's success in achieving results. The *output* of a program is the necessary object of scrutiny; economy and efficiency considerations in administering the program are secondary except as they relate to the

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<sup>17</sup> The GAO document, *Evaluation and Analysis to Support Decisionmaking* (September 1976) provides material on program assessment and assessing alternatives from the entity management's viewpoint.

<sup>18</sup> Joseph S. Wholey et al., *Federal Evaluation Policy* (Washington, D.C.: The Urban Institute, 1973), p. 23.

quantity or quality of the output. Economy could be a negative factor if it results in an inability of the program to achieve its objectives or dilutes potential benefits by preventing full and effective use of the funds authorized for the program.

### **Assessment**

In order to determine whether program objectives are being achieved, the practitioner must be satisfied that the criteria used are valid and do, in fact, reflect accomplishment of the objectives. There is often a tendency on the part of program managers to measure results in terms of program activities; that is, the efforts expended in pursuit of objectives. While this may be valuable for supervisory purposes and for the determination of economy and efficiency, it is not, in most instances, useful for assessing program results, and the CPA must be careful not to equate program activities with program success.

Measures of overall program effectiveness must concentrate on accomplishments, not on activities. In evaluating a water quality program, for example, the improvement in water quality is what should be measured. Dollars spent, chemicals consumed, or strategies in force are important, but they are not pertinent to the measurement of program success. When success is not easily quantifiable, as is frequently the case in social programs, the task of measuring program effectiveness can be difficult or even impossible.

Evaluating the validity of management's assessment of program results will require the practitioner to be satisfied with the system or analytical process used by management as well as with the reliability of the actual data which have been used as a basis for the assessment. CPAs have long worked with the concepts of objectivity, evidential soundness, and systems evaluation and are therefore familiar with what is required in such reviews. However, difficulties may be encountered in the process of evaluating empirical studies. Research specialists with extensive knowledge relating to the activity (program) being reviewed may have to be consulted in some instances. (In the private sector, this would be similar to using someone with industry knowledge rather than applying only technical knowledge.)

### **Alternatives**

When alternatives exist which can achieve the desired program results more effectively or at a lower cost, the practitioner will report on the specific areas in which he can make constructive recommendations. If the program is to be evaluated for economy

and efficiency as well as program results, an in-depth study such as that described in the previous chapter is required. If the engagement calls only for a program results evaluation, any economy or efficiency recommendations not impacting the program results would be purely a by-product of the work entailed in the evaluation of program results. In either case, however, the practitioner should be alert to desirable alternatives. Entity management may have considered the alternatives, but if they did not, the practitioner may suggest further study. A recent GAO document suggests that a consideration of alternatives might include the following:<sup>19</sup>

- Developing a range of alternatives
- Screening the preliminary alternatives
- Estimating the measurable consequences
- Assessing provisional orderings
- Determining the impact of constraints
- Reassessing the orderings of the alternatives
- Checking the completeness of the assessment

## **Defining the Scope of a Program Results Evaluation Engagement**

Defining the scope of a program results evaluation is very much analogous to the same process in a management advisory services engagement. The CPA must, by means of a survey, determine the depth of review required to develop findings and to make appropriate recommendations. He may also have to make judgments on whether participation of other experts will be required. Five major areas should be surveyed:

- Nature of the program: goals and objectives
- Nature of the organization
- Policies and procedures for carrying out the program
- Financial data
- Measurement system

### **Nature of the Program: Goals and Objectives**

A key determinant of the scope of a program results evaluation is the nature of the program itself. It is fundamental that the

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<sup>19</sup> U.S. General Accounting Office, *Evaluation and Analysis to Support Decisionmaking* (Washington, D.C.: U.S. GAO, September 1976), p. 23.

program being reviewed be understood by the practitioner. In the case of grants, the practitioner will have to review the grant request and grant agreement to determine objectives and conditions. In the case of organizations or programs, considerable research may be necessary, including federal law, legislative history, and federal regulations. The assistance of qualified counsel may be necessary.

The program goals and objectives define the standards on which measurements should be based. They also provide valuable insight into the specific nature of the program and the specific technical skills which may be required.

If a precontract survey reveals the absence of defined goals and objectives, the CPA should meet with management to determine if the goals and objectives can be identified before starting the engagement. It may be determined that a more extensive effort is necessary, requiring further work on the part of management, either alone, or through a separate consulting engagement.

### **Nature of the Organization**

The nature of the organization carrying out the program is essential background information. Of special interest are the following:

- Entity status (public or private)
- Mission (single or multipurpose)
- Tenure (temporary or permanent)
- Organization structure (responsibilities, functions, and reporting relationships)
- Relationships of the program to other programs within the organizational structure

### **Policies and Procedures for Carrying Out the Program**

The practitioner should survey the entity's current management processes, including planning, policies, procedures, performance measurements, and controls and the process by which management seeks continually to improve the program's productivity.

### **Financial Data**

A program results evaluation includes cost considerations. The availability of budgetary and detailed expenditure data will be important to work program determination. If a financial audit is not part of the engagement scope, the pertinent financial data will have to be accumulated separately and identified as unaudited.

## **Measurement System**

Perhaps the most important determinant of evaluation scope is the degree to which reliance can be placed on the program results measurement system or process; that is, in the same way that the review of internal control and accounting procedures determines traditional audit scope. Obviously, little credence can be attached to program results data produced by a basically unreliable system or evaluation process. All important aspects of program evaluation systems must be documented and tested. The scope of this testing will depend upon the amount of reliance which can be placed upon the controls built into the system. In the case of empirical results studies, the plan of study and study design will be important aspects in the practitioner's determination of measurement validity.

A critical aspect of a program results measurement system is the suitability of the measures themselves. There will almost never be one net result, such as profit. Often, a direct measure of program results will not be available. Even if there are measures in use, the practitioner must still decide if they correctly define effectiveness and must determine the correlation between the measurements made and actual program results. This may require the use of specialized program consultants.

## **Conduct of a Program Results Evaluation**

In evaluating program results as reflected in a program's records and reports, the practitioner must consider the following:

1. Are the evaluation criteria meaningful?
2. Is the method for measuring program results appropriate?
3. Are the program data accurate?
4. Is management's assessment of the achievement of program goals and objectives reasonable?

Once the data collection and analysis system itself has been documented and tested, major emphasis is placed on the detailed examination of the results measurements in accordance with the agreed scope. The professional role of the practitioner is to make a judgment, based on his examination of the quantitative and qualitative measurements produced by the system or analytical process.

The quantitative judgments include correlation with objectives, statistical validity, consistency, comparability, and arithmetic accuracy.

While this process of quantitative evaluation will not be new to a practitioner, the measures themselves may be unfamiliar. Qualitative judgments, by their nature, are not as precise as quantitative judgments. Nevertheless, qualitative judgments will often be required, and the practitioner should be prepared to defend them.

In judging the validity of the methods used to measure program results, the practitioner should be aware that a number of methods for measuring program results can be utilized by management. These include—

1. Comparing data accumulated prior to program inception to data accumulated later.
2. Comparing postimplementation data with equivalent data gathered in areas where the program is not in effect but conditions are otherwise similar.
3. Establishing control groups which are not affected by the program so that comparisons can be made regularly between affected and unaffected groups.
4. Comparing estimated data for preprogram periods to actual postimplementation data.
5. Establishing quantitative and qualitative program results targets when a program is first implemented and measuring program results on the basis of advancement toward the targets.

Measurement methods should be capable, wherever possible, of differentiating changes attributable to the program from other changes. Unfortunately, this cannot always be done. An example would be the attempts to evaluate the Head Start program, which would have required separating the many influences on ghetto youngsters from prenatal days onward. The credibility of the measurements, however, depends heavily on the existence of a demonstrable causal relationship between program activities and the accumulated results data. Any other factors which could have caused the observed changes should be carefully considered. This is particularly important when comparisons are made with data gathered in areas where the program is not in effect (item 2, above).

In some cases, management will not have made an assessment due to the absence of accumulated data or measurement criteria, or for other reasons. The CPA may be asked to participate in a program results evaluation effort himself by establishing criteria, accumulating data, and then assessing the program results. In such instances, the nature of the work required and the practitioner's responsibility will differ substantially from an evaluation of man-



agement's assessment of program results. Since this may not be known in advance, the CPA should arrange contractual options to cover such situations so that he will not be limited in the exercise of his professional judgment whether and under what conditions he will undertake such work.

## **Illustrative Approach to a Program Results Evaluation**

Unlike evaluations of economy and efficiency, which have long been conducted in government and industry under other names, program results evaluations, in which the results are not described in terms of productivity increases or dollars and cents, do not yet have an extensive body of literature which includes guidelines and case histories.

Appendix A of this document reproduces GAO Audit Standards Supplement Series No. 6, *Air Pollution Control Program, Sassafras County, Maryland*. It includes a sample audit guide for a program results evaluation for an air pollution control program. A practitioner should obtain any applicable audit guide for the program he will be evaluating before developing a work program. Such guides may eventually include material on the evaluation elements of expanded-scope audits as defined by the GAO.

The practitioner who undertakes a program results evaluation engagement where management has made an assessment of program results should consider the following pattern of steps when developing his work program:

1. Review the goals of the program with management and confirm the continued applicability of the goals identified during the survey.
2. Review the evaluative criteria and recommend any necessary changes.
3. Confirm the program objectives for each of the evaluative criteria.
4. Conduct appropriate tests to determine whether the entity is failing to comply with any applicable nonfinancial laws and regulations affecting program activities (e.g., environmental, equal opportunity, and so forth.)
5. Review data systems and internal controls.
6. Review and substantiate data and reports determining performance for each of the evaluative criteria.
7. Determine possible reasons for failure to achieve program goals and objectives.
8. Develop and document conclusions and recommendations.

## Program Results Evaluation Pilot Projects

In 1973, the General Accounting Office and the International City Management Association established pilot program results evaluation studies in ten cities, two counties, and one council of governments. (Four of the pilots utilized independent public accounting firms, while the remainder involved internal staff auditors, management consultants, and personnel from other government agencies.) Reports of all studies, now completed, indicate varying degrees of success.<sup>20</sup>

While the engagement circumstances surrounding these pilot projects differed considerably from what a CPA might encounter in an actual engagement, there is something to be learned from what the involved city management personnel identified as the benefits and problems, as seen from their own perspective.

Reported benefits include—

- An increased concern about, and a better understanding of, program results that lead to greater concentration on results rather than processes.
- An opportunity for employees to make suggestions and participate in the improvement of program operations.
- An insight into the potential benefits of program results evaluations and a stimulus to the conduct of additional studies.
- Direct savings resulting from implementation of recommendations.
- Development of a greater sense of accountability on the part of the line managers.
- Improvements in community services.
- A first step toward formalizing a public feedback process.

Problem areas revealed a need for—

- Better briefing of entity personnel to reduce increasing anxieties.
- Increased availability of information required by the evaluation team.
- Clearer understanding of the political and economic constraints of the entity on the part of the evaluation team.

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<sup>20</sup> International City Management Association, Management Information Service Report, Special Report, volume 8, *Performance Audits in Local Governments—Benefits, Problems & Challenges* (Washington, D.C.: International City Management Association, April 1976).

- Less concentration on financial aspects and more on program operations and results.
- Better communication of weaknesses and findings to top-level management during the course of the engagement.
- More program orientation and technical proficiency on the part of evaluation team members.
- More emphasis on reviewing measurement systems as opposed to current data.
- Greater caution in placing dollar values on recommendations unless they are adequately supported.

## **Program Results Engagement Caveats**

The art of evaluating program results is still in a very early stage of evolution. If called upon to conduct direct evaluations rather than evaluations of management's assessment of results, the practitioner must realize the experimental nature of what he is undertaking. There are no AICPA standards such as those for financial audits, or even guidelines such as those which can be found for evaluations of economy and efficiency in certain operations. Frequently, adequate criteria, meaningful measures, or accurate data will be lacking, which makes an evaluation impossible without extensive preliminary work. In many cases, governmental programs do not generate short-term results, making meaningful results measurement efforts a matter for the future. When making an evaluation of *management's* assessment of results, care must be exercised for the same reasons. Management's assessment is often "experimental" and the CPA is being asked to validate the experiment.

In addition to difficulties that may affect the conduct of the engagement, the CPA should be sensitive to the political environment in which the program exists. All in all, there is much to be learned before program results evaluation engagements become routine.

## Reporting Evaluation Engagement Findings

Professional standards for reports on financial audits are extensively documented and readily available. In contrast, AICPA standards do not exist for reports on evaluations of economy, efficiency, or program results. The practitioner should, therefore, refer to such guidance available in the GAO standards document and the GAO audit standards supplement series, particularly No. 6, *Air Pollution Control Program, Sassafras County, Maryland*. Other actual GAO reports are available and lists of such reports are published monthly.<sup>21</sup>

Some valuable (though unofficial) material on reporting the results of operational audits, which are somewhat similar to evaluation engagements, appears in an AICPA Continuing Professional Education course entitled, *Operational Auditing*. The balance of this chapter presents an edited and augmented version of that material.<sup>22</sup>

### Key Aspects of Evaluation Reports

An evaluation engagement report will differ from a financial audit report, particularly with regard to the following:

*Expression of an Opinion.* A financial audit report normally includes a standard accountant's report which contains the CPA's opinion unless it specifically states that no opinion is expressed. An evaluation engagement report would contain no similar expression of opinion but would comment on specific findings. The fact that an opinion will not be provided should be stated in the original engagement letter and in the report.

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<sup>21</sup> Monthly and semiannual lists of GAO reports and other publications are available from the U.S. General Accounting Office, Washington, D.C. and are sent to those who request their name be added to the mailing list.

<sup>22</sup> Adapted from the manual for an AICPA course entitled *Operational Auditing—Basic*.

*Subject Matter.* The difficulties encountered in writing an evaluation engagement report stem from the infinite variety of subject matter. Also, for each activity there are readers with differing backgrounds and needs—from high-level officials on down. The practitioner must be able to reach all levels and act as an expert “translator,” rendering technical language and complex concepts into plain English. He must write for the reader and avoid technical jargon.

To invite reading by high-level individuals, many CPAs condense all major findings and recommendations into a short summary report. Detailed reports should also be available if any such individuals indicate interest in a specific area. Reducing a voluminous report to a short summary demands that priorities be assigned to each finding and that only those of greatest significance be mentioned.

The assignment of an importance rating to findings and recommendations and reporting them in order of decreasing importance is another aid to the time-conscious reader.

*Report Acceptance.* In financial and accounting areas, a CPA is usually accepted as an expert. In these areas his opinion is therefore seldom questioned, and the basis for a recommendation or opinion may be stated in general terms and still be entirely acceptable. The same does not necessarily apply to reports on operational activities.

The practitioner can help overcome possible reluctance to accept the report by—

1. Delineating clearly the *scope* of his study and communicating frequently with operating personnel during the study.
2. Explaining the *standards* or criteria used in measuring performance.
3. Setting forth explicitly the *evidence* supporting his findings, including any developed by outside experts. See page 13 for the excerpt from *Guidelines for Cooperative Management Advisory Service Engagements* on this point.
4. Discussing report drafts with the supervisors and managers of the entity and, if appropriate, including their views in the report.

These matters are discussed more fully in the following paragraphs.

*Scope*—In an evaluation engagement report, the statement of scope requires careful drafting to tell the reader what the practitioner did and what he did not do. Here the practitioner can set

forth the limitations of his study when he wishes to disclaim responsibility for technical areas beyond his competence. For example, in a review of controls over engineering drawings, the practitioner may state his findings on the controls devised by management to ensure the accuracy of drawings, but he may wish to point out specifically that he did not examine the quality of the drawings themselves. If the engagement does require a review of the quality of the drawings, he should secure adequate counsel from outside experts. Unless precautions are taken, the CPA could be held responsible for the quality of the drawings and all subsequent activities that depend upon that quality.

*Standards*—When reporting on a technical area, the practitioner gains better acceptance if he sets forth the standards or criteria used in measuring the function or activity he has reviewed. He may determine these from statements of policies and procedures, from discussions with responsible management personnel, from contractual terms, or from authoritative writings on the subject. In the engineering drawing controls example, the practitioner might establish the following standards-related documents as the basis for his findings: (1) an engineering standards manual, available to all draftsmen, setting forth the company's drafting requirements; (2) reports of drawings reviewed by independent drawing reviewers to ascertain whether the company's drafting instructions have been followed and that the work is accurate; and (3) management reports on the number of drawing corrections required to correct drawing defects.

The use of documented standards as yardsticks to measure performance will form the basis for an evaluation that should gain acceptance. Where standards have not been established by management, the need for them should be reported.

*Evidence*—Expressions on operational activities, particularly adverse conclusions, must be clearly supported by adequate evidence based on analyses and tests, if they are to be accepted. In the engineering drawing controls example; the practitioner's report could set forth the following reviews made: (1) the number of draftsman interviewed to determine whether they had handbooks readily available to them and the number of handbooks in use that had been compared with a master volume to make sure that they were up to date; (2) the number of drawings examined for evidence of engineering check and compliance with corrections made as requested by the checkers; and (3) the substantiation of the statistical data given to management on the number of drawing corrections required by production departments.

In his report the CPA should specify where he has relied on outside experts and clearly state when he is *not* accepting responsibility for the work of those outside experts. (Note: When rendering an unqualified opinion on an audit of financial statements, the auditor is not permitted to make reference to outside experts. See SAS No. 11. However, in reporting on evaluation engagements, reference to outside experts is permissible and often necessary. See MAS Guidelines No. 5).

*Discussion of draft report*—Discussion of the evaluation results with operating personnel is of special importance. It is essential that the practitioner state and interpret his facts correctly. Also, he must be certain to consider all the factors that touch upon a particular operation. Finally, the practitioner must be sure to translate the technical jargon accurately; operating management may attach meanings to certain words which the practitioner has perhaps not clearly comprehended. For this reason it is recommended that the practitioner review his findings and conclusions with a knowledgeable member of line management prior to his formal report to management. This “dry run” will help determine whether the initial conclusions are reasonable.

## **Positive Reporting**

Since one of the main purposes of evaluation engagements is to assist management in improving operations, the practitioner should strive to emphasize the positive in reporting. Therefore, criticism of operations should be constructive. Experience has shown that operating management is more cooperative if you express comments in a positive way, using such words as “strengthening,” “improving,” “increasing,” “enhancing,” and so forth. Proper use of this technique will not conceal negative findings but will present them in a way less likely to cause a defensive reaction which could limit the report’s value.

When reviewed activities are not found to require corrective action or when it is known that earlier recommendations have been implemented, the report should include these facts. Too often the omission of favorable comments completely distorts the perspective of the reader. From a report containing solely critical comments, he may conclude all-around poor performance; whereas, the sub-standard performance may be in only a small fraction of the total operation. Positive reporting can significantly influence client implementation of recommendations, but may require some extra writing effort by the practitioner to achieve the desired effect.

## Reporting of a Finding

Well-developed evaluation findings have certain distinct but common attributes that provide a basis for the report: (1) condition, (2) criteria, (3) effect, (4) cause, and (5) recommendation.

*Condition.* For each finding there should be a statement of condition describing the situation. This statement should specifically identify the problem, that is, what needs strengthening, what needs improving, what should be corrected and why, and so on. The statement should also provide perspective, indicating whether it is an isolated or a widespread condition. Information making up the statement of condition must be accurate, well-supported, and worded as clearly and precisely as possible.

*Criteria.* Criteria used for the statement-of-condition section should be clearly identified, using such sources as laws and regulations, contractual terms, accepted specifications, criteria established by management, and so on. Often the practitioner may have to rely upon his professional knowledge, experience, background, and personal skills. In these situations, he assumes the burden and obligation to convince the report reader of the validity and wisdom of the criteria. Of course, the further away the practitioner goes from relying on some outside authoritative source, the more controversial his finding is likely to be. Conversely, there are often situations where the condition virtually speaks for itself.

*Effect.* Whereas the legitimacy of a finding depends on criteria, the attention given the finding depends largely on its materiality, which is judged by effect.

Efficiency, economy, and effectiveness are useful measures of effect and are frequently stated in quantitative terms such as dollars, time, units of production, number of procedures and processes, or transactions. Where past effects cannot be ascertained, potential future ones may be presented. Sometimes, effects are intangible but of major significance. In any event, the effect of the condition should be presented as clearly as possible.

*Cause.* Before the practitioner can make constructive recommendations, he needs to determine the causes for the condition or problem. When it is known why something has happened, recommendations can be made to prevent it from recurring. Where the cause is physical, pictures included in the report will often convey the idea more effectively than words.



*Recommendation.* Possible lines of corrective or preventive action are needed as a basis for constructive recommendations.

When it is not practical to be specific, a general recommendation is appropriate. For example, the practitioner might suggest additional study in areas where specific recommendations cannot be made. In all cases, however, the relationship between the cause and the recommendation should be clear and logical so that both are presented in a harmonious manner.

In making recommendations, the practitioner should see them as management might see them, weighing increased benefits against their costs.

Suggestions advanced by the practitioner for corrective action should be able to withstand certain tests.

1. Are the corrections economical? Would they cost more than a continuation of the deficiencies?
2. Are there other much simpler, if slightly less perfect, methods available to correct the deficiency?
3. Does the corrective action go to the heart of the deficiency or just correct symptomatic matters?
4. Does the corrective action take into account why the deficiency occurred and who was responsible for it?

Recommendations for corrective action are, from the entity management's point of view, an important aspect of the practitioner's report. In pointing out problem areas, the report may only be reinforcing management's knowledge of a situation which it has been unable to correct. In suggesting a corrective action, the practitioner is providing management with an approach which management may accept, reject, or modify, but which will more likely result in some management action. Since this is the intent of such recommendations, the report should specify where the responsibility for taking action lies within the entity being reviewed.

## **Relationship of Existing Professional Standards to Expanded-Scope Government Audits as Defined by the GAO: Interpretive Comments**

In conducting financial audits for any client, CPAs are guided by basic professional standards which have long been accepted. Just as there can be pitfalls in responding to an RFP for a government audit without considering the potential effects of the expanded-scope audit elements on engagement planning, there can also be problems if the practitioner applies only the generally accepted auditing standards to engagements involving evaluations of economy, efficiency, and program results. The purpose of this chapter is to alert the practitioner to the need to adapt the existing standards to what may be a very different kind of audit.

Engagements to evaluate efficiency and economy or program results are referred to as audits by the GAO. It is apparent, however, that these expanded-scope audit elements draw heavily not only on auditing and accounting skills but upon the techniques and expertise more typically associated with the conduct of operational and systems reviews as well. The AICPA's generally accepted auditing standards are designed to be applicable when a CPA is associated with financial statements. There are also MAS practice standards, which are applicable in carrying out a management advisory services engagement. In many situations, the AICPA's generally accepted auditing standards and the MAS practice standards, either separately or collectively, may not be adequate for these expanded-scope audits as defined by the GAO. Therefore, presented on the following pages are interpretive comments on certain existing standards of the CPA profession which are relevant for the evaluation elements of such expanded-scope audits. Practitioners should continue to refer for guidance to the Code of Professional Ethics (including Rule of Conduct 101) and the generally accepted auditing standards and MAS practice standards, as well as to the GAO standards document and the AICPA audit guide, *Audits of State and Local Governmental Units*.

These comments on the application of existing professional standards to expanded-scope audit engagements in accordance with GAO standards are intended only to illustrate situations where special care should be taken by the practitioner. As always, professional judgment must be exercised in the application of professional standards to each new situation.

## **Interpretive Comments on Professional Standards**

### **Independence**

In the conduct of financial audit engagements, a practitioner must be independent both in appearance and in mental attitude.

The appearance of independence historically has been of importance in a CPA's financial audit practice. While rules of independence have not been as rigid with MAS practice, the GAO indicates that the role to be fulfilled in these expanded-scope audits requires the same degree of independence as for any financial audit engagement.<sup>23</sup> Therefore, if a CPA serves an entity of government or a grant or loan recipient as a director or officer or in a capacity equivalent to that of a member of management, this could preclude him from conducting an evaluation engagement for that entity. For example, if a practitioner is on a school board, it would preclude him or his firm from conducting an engagement to evaluate economy, efficiency, or program results, as defined by the GAO, as well as a financial audit for that school district.

### **Specific Knowledge and Competence**

Practitioners performing an engagement must have, or obtain, technical competence in the analytical approach and process and the technical subject matter under consideration. The analytical approach described on page 19 is important in all engagements regardless of the organization or function. In addition, if an electronic data-processing function is to be reviewed, the practitioner should possess or obtain, prior to completion of the engagement, adequate electronic data-processing knowledge and skills, including EDP administration, management, and organization. If, for example, in programmatic areas some aspect of law enforcement is to

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<sup>23</sup> U.S. General Accounting Office, *Standards for Audit of Governmental Organizations, Programs, Activities & Functions* (Washington, D.C.: U.S. GAO, 1972), pp. 15-18.

be reviewed, the practitioner should possess or obtain the necessary understanding of the general program area.

### **Due Care**

Due professional care is to be exercised in the conduct of every aspect of expanded-scope audit engagements. The public will expect the same degree of care and diligence with evaluations of economy, efficiency, and program results that CPAs have traditionally brought to their work.

For example, in an evaluation of the results of a program to improve "response time" to an emergency by a police department, the practitioner will be expected to have satisfied himself as to the reliability of the data used as a basis for the evaluation.

### **Engagement Understanding**

For any evaluation engagement, the specific functional and/or programmatic areas to be reviewed and reported on must be specifically identified.

For a program results evaluation, a common understanding of the related goals and objectives of the program under examination must be reached by the contracting parties. The evaluation criteria should be understood by the contracting parties. In cases where a CPA is participating directly in evaluation rather than reviewing management's assessment, the criteria should be developed and accepted by the management of the entity under review before field work on the evaluation itself commences. If the practitioner finds that the criteria necessary for the conduct of an effective evaluation are lacking (i.e., criteria not acceptable or not established), he should not proceed with the evaluation until acceptable criteria are made available by the entity's management.

When conformity with legal and regulatory requirements is involved, the applicable constitutional, charter, or statutory requirements, as well as the administrative policies, rules, and regulations against which the entity's actions are to be evaluated, should be made readily available by the entity for reference by the practitioner.

In cases where the entity cannot supply the practitioner with the materials needed to perform the evaluation (e.g., applicable laws and regulations or evaluation criteria), the practitioner may agree to assist the entity in securing or developing whatever may be required when appropriate. These additional efforts may be handled either by negotiating an extension of the scope of the evaluation

engagement or as a separate consulting engagement. This should be documented as part of the engagement understanding.

### **Sufficient Relevant Data**

Sufficient relevant data must be obtained, documented, and evaluated before developing conclusions and recommendations. Early in an engagement, or preferably before commencing an engagement, the practitioner should exercise his professional judgment to determine the relevant type and amount of data required, as well as its availability.

For example, a mental health institution may have an objective of discharging 90 percent of its patients back to the community, successfully treated, within 90 days of admittance. The practitioner should ascertain the availability of data to document findings relative to such an objective. He should also determine whether and how he can test the reliability and relevance of such data, and thus the resulting reported accomplishment, against the stated objective.

### **Communication of Results**

The results of the engagement are to be communicated in a report to the client. The report should include the basis for the findings and recommendations of the practitioner with respect to the specific functional or programmatic areas under review. Conclusions and recommendations should be reviewed with the client and with management of the entity under review prior to a report being issued. Differences of opinion and concurrences resulting from this review should be reflected in the final report.

**GAO Audit Standards Supplement No. 6  
Illustrative Report  
Air Pollution Control Program,  
Sassafras County, Maryland**

The following pages reproduce the above titled GAO document. It should be noted that the illustrative report is also intended for the guidance of governmental audit agency personnel and may not comply in all respects to the standards under which a CPA would report.

# ILLUSTRATIVE REPORT

AUDIT STANDARDS  
SUPPLEMENT  
SERIES NO. 6

Prepared in accordance with  
the GAO audit standards

## AIR POLLUTION CONTROL PROGRAM SASSAFRAS COUNTY, MARYLAND



BY THE COMPTROLLER GENERAL  
OF THE UNITED STATES  
1975

## **FOREWORD**

On August 1, 1972, the United States General Accounting Office (GAO) issued "Standards for Audit of Governmental Organizations, Programs, Activities & Functions." These standards were developed for application at all levels of government in the United States.

### **OBJECTIVE OF GAO STANDARDS**

A principal objective of the GAO standards is to stimulate State and local governments to improve the character and scope of audits<sup>1</sup> of federally assisted programs. It is generally agreed that the Federal Government should rely, to the extent practicable, on audits undertaken by State and local governments to eliminate the duplicate audit coverage that results when Federal, State, and local auditors independently audit programs and activities without regard to the needs of the other levels of government.

### **RELATIONSHIP OF GAO STANDARDS TO AICPA STANDARDS**

Because many State and local governments engage independent public accountants to audit their activities, the GAO standards have been of great interest to the public accounting profession. The scope and expected results of the audits contemplated in the GAO standards are perhaps the areas of greatest interest.

Some members of the public accounting profession have asked why GAO considered it necessary to publish auditing standards when the American Institute of Certified Public Accountants (AICPA) has had widely accepted auditing standards for many years and has a committee continually considering this subject.

For audits of financial statements, the AICPA standards were incorporated in the GAO standards. However, the GAO standards are broader and were developed primarily to cover additional areas of interest to government officials, legislators, and the public, as explained below.

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<sup>1</sup>The term "audit" or "auditing" is used in this report in the sense in which it encompasses the examination of financial operations and legal compliance, the review of economy and efficiency, and the review of program results.



AICPA cooperated in the development of the GAO standards. In November 1973 AICPA published "Auditing Standards Established by the GAO--Their Meaning and Significance for CPAs" which contained the following comment.

"The Members of this Committee [AICPA Committee on Relations with the General Accounting Office] agree with the philosophy and objectives advocated by the GAO in its standards and believe that the GAO's broadened definition of auditing is a logical and worthwhile continuation of the evolution and growth of the auditing discipline."

### **BROAD SCOPE AUDITS NEEDED FOR GOVERNMENT PROGRAMS**

The objectives of governmental programs and activities are varied, dealing generally with promoting citizens' safety, health, and welfare. Therefore, measures of the effectiveness of government activities must focus on what the programs are intended to achieve and what they actually achieve with the resources used.

Moreover, since such programs are financed with taxpayers' funds, there is an accompanying need to know whether funds are properly safeguarded from loss, laws and regulations governing the use of these funds are followed, and those spending the funds achieved reasonable efficiency and economy in carrying out their work.

Responsible government officials must be held accountable in all of these areas. GAO's auditing standards therefore provide for audits of a broad scope, consisting of the following elements:

1. Financial and compliance--determines (a) whether financial operations are properly conducted, (b) whether the financial reports of an audited entity are presented fairly, and (c) whether the entity has complied with applicable laws and regulations.
2. Economy and efficiency--determines whether the entity is managing or utilizing its resources (personnel, property, space, and so forth) in an economical and efficient manner and the causes of any inefficiencies or uneconomical practices, including inadequacies in management information systems, administrative procedures, or organizational structure.

3. Program results--determines whether the desired results or benefits are being achieved, whether the objectives established by the legislature or other authorizing body are being met, and whether the agency has considered alternatives which might yield desired results at a lower cost.

## **AVOIDANCE OF DUPLICATION IN AUDITING**

As the Federal Government makes more funds available to State and local governments through specific-purpose grants and revenue sharing, its goals and objectives become more closely related to those of State and local governments. Local government officials and legislators want to know what particular programs are achieving at the local level; State officials and legislators want to know what these same programs are achieving on a State-wide basis; and Federal officials and the Congress want such information on a national basis. Citizens are interested in what is happening at all levels.

If an audit is to be made of a particular grant or similar activity in which more than one level of government is interested, it should be made with appropriate standards so the result will be useful to all interested parties. Such an approach should not only save the costs inherent in duplicate auditing but also make the examination and review processes more effective by making it possible for the auditor to gain a more complete understanding of the program he is auditing.

## **PURPOSE OF THIS ILLUSTRATIVE AUDIT**

This illustrative audit was undertaken to demonstrate one type of situation where an audit of a local governmental activity could provide information needed at the local level and also deal with questions and issues of interest to the State and Federal levels of government.

This example is based on an audit made by a GAO regional office of the Air Pollution Control Program jointly funded by a local government and the Environmental Protection Agency (EPA). Because the audit is being used for illustrative purposes and the report will receive wide distribution, we have used a fictitious name for the local government audited.

The reporting concepts illustrated in this example are different from those commonly used by public accounting firms and most governmental audit organizations. This reporting approach is based on the assumption that the Federal agency furnished an audit guide to the grantee (the county) who contracted with the public accounting firm and that the public accounting firm was required to report


back to the grantee, the State and the Federal agency the information developed and conclusions reached, if applicable, on each of the areas covered in the audit guide. Following this approach, both the program managers and auditors at the Federal level can consider the combined results of independent audits at several locations and thus gain a broader view of how the program is being carried out.

We do not contemplate that local governments would make audits of this scale annually for programs such as the Air Pollution Control Program. Auditing such programs on a 3- or 5-year cycle or performing audits of the programs of statistically selected State and local governments may be the better way of obtaining necessary information on many national programs.

Although auditors normally do not include the audit guidelines with their report or cross-reference their comments in the report to the audit guidelines, we have done so in this instance so that auditors and managers can relate the comments in the report with the audit guidelines used.

The design of reports on audits which cover examinations of financial operations and compliance with applicable laws and regulations, reviews of efficiency and economy of operations, and reviews of program results is a relatively new undertaking. This is particularly true where an audit at the local level is made--the results of which will be of interest to officials at that level as well as at State and Federal levels. Developing reporting techniques in this area will be an evolutionary process. This report is a start. GAO intends to publish other examples showing other approaches.

This report demonstrates the type of reporting contemplated by the GAO standards when programs at the local government level are to be audited according to Federal guidelines. GAO prepared the audit guidelines used (appendix I) after consulting EPA officials.

  
Comptroller General  
of the United States

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ILLUSTRATIVE REPORT

AIR POLLUTION CONTROL PROGRAM

SASSAFRAS COUNTY

MARYLAND



**UNITED STATES GENERAL ACCOUNTING OFFICE**  
**WASHINGTON, D.C. 20548**

March 31, 1974

The County Council  
Sassafras County, Maryland

Ladies and Gentlemen:

This report presents the results of our audit of the Sassafras County, Maryland, Air Pollution Control Program. Our audit was made in accordance with the GAO Standards for Audit of Governmental Organizations, Programs, Activities & Functions and included:

1. An examination of financial operations and legal compliance matters for the period from July 1, 1972, to June 30, 1973. (At the time of our audit, a local air pollution control ordinance had not been enacted and the transportation strategies required in the Maryland State Implementation Plan of 1973 had not been approved by the Environmental Protection Agency (EPA). Therefore, our review of the county's compliance with applicable laws and regulations was directed primarily to compliance with EPA regulations and grant requirements.)
2. A review of efficiency and economy of operations for the period from July 1, 1972, to December 31, 1973.
3. A review of program results for the period from July 1, 1972, to December 31, 1973.

Our audit included a study of (1) the county's applications for Federal grants under the Air Pollution Control Program, (2) the approved grants and expenditures associated with such grants, (3) the county's financial reports for the program for the fiscal year ended June 30, 1973, and reports of operations for the 18-month period ended December 31, 1973, (4) the Maryland State Implementation Plan of

1973, and (5) such other data considered necessary in the circumstances. We interviewed officials of the county's Air Pollution Control Section and Finance Department, the Maryland Bureau of Air Quality Control, the Metropolitan Council of Governments, and EPA.

The results of our audit are presented in the following chapters. (For ease of reference, sections of the report are numbered to correspond with the pertinent sections of the audit guidelines. See app. I.)

## BACKGROUND

Under the 1967 Air Quality Act and the Clean Air Act of 1970, the Congress provided for technical and financial assistance for air pollution prevention and control programs at the State and local governmental levels. The Congress believes these levels of government should be responsible primarily for preventing and controlling air pollution at the sources, except for sources attributed to new motor vehicles for which the Federal Government has primary pollution control responsibility.

Since June 1968 Sassafras County has received Federal assistance from EPA to partially finance an Air Pollution Control Program which is part of the Maryland State Implementation Plan.

## FINANCIAL OPERATIONS AND LEGAL COMPLIANCE

The annual report of expenditures we examined was for the fiscal year ended June 30, 1973. Our opinion thereon, which appears on page 11, is qualified to the extent that the salaries for certain personnel were charged to the program, even though the employees involved devoted part of their time to activities other than air pollution control. We estimate that such expenditures charged to the program for the fiscal year ended June 30, 1973, approximated \$1,900; about \$1,200 was reimbursed under the EPA grant. A determination as to whether

these costs will be allowable or unallowable under the grant must be made by EPA.

Because the grant stipulated that the people filling air pollution control positions would spend 100 percent of their time on air pollution activities, we recommended--and the county Director of Environmental Resources agreed--that the procedures should be revised so that the program would be charged only for the time personnel worked on it.

With respect to the county's compliance with applicable local, State, and Federal air pollution control laws, we found that:

1. At the time of our audit there were no local air pollution control laws, although a proposed local ordinance was then being considered by the County Council.
2. EPA had not approved the transportation control strategies required in the Maryland State Implementation Plan.
3. Sassafras County had complied with EPA's specified means of collecting and analyzing air samples except for a spectrophotometer which was different from the one EPA specified. The difference would have no significant impact on the quality of sample analyses.

#### ECONOMY AND EFFICIENCY

There are items of equipment on hand worth \$6,700 which are no longer needed or being used by the county. (See p. 21.) We are recommending that EPA consider whether the equipment could be used by some other grantee.

#### PROGRAM RESULTS

The county substantially achieved the intermediate abatement objectives set forth in the 1973 EPA grant, with the following exceptions.



1. According to the grant, the county was supposed to establish a program for controlling particulates from construction and material handling. Air pollution control officials said such a program had not been established because of a lack of agreement on the responsibilities of other county units, such as the Police Department and the Department of Public Works. (See p. 31.)

We recommend that the Council, while considering the county's proposed air pollution control ordinance, define clearly the responsibilities of the county units for enforcing the ordinance.

2. The county public school system must convert all of its school facilities from residual fuel oil or install particulate-capturing equipment by October 1, 1974. As of March 31, 1974, the school system had not submitted a plan for compliance despite requests from the Air Pollution Control Section. (See p. 31.)

We recommend that the Council require the Superintendent of Schools to submit a fuel conversion plan as requested by the Air Pollution Control Section.

The emission inventories show that the county made some progress during 1973 in controlling particulates. However, carbon monoxide and photochemical oxidants levels in Sassafras county apparently are the major problems; the national air standards for carbon monoxide and photochemical oxidants are being exceeded at an increasing rate. (See pp. 37 to 39.)

These pollutants exceeded EPA air quality standards on 86 days during the 18-month period reviewed. The 1975 national air quality standards provide that applicable levels not be exceeded more than once a year for each pollutant.

Motor vehicles are the primary sources of carbon monoxide and photochemical oxidants, but the county exercises almost no control over that source of air pollution. The Federal Government is responsible for controlling pollution from new mobile sources, and the State is responsible for inspecting air pollution control devices on cars registered in Sassafras County.

The following conditions were observed with regard to the county's air pollution control activities.

1. Although the county had acquired EPA-specified air monitoring equipment which was in good working condition at the time of our audit, no samples were taken during significant periods in the 18-month period covered by our audit. (See p. 39.) County and State officials should closely examine this situation.
2. The county's report of operations for the program was inaccurate because it was incorrectly prepared and the Air Pollution Control Supervisor did not adequately review it. As a result, the number of times the air quality standards were exceeded was not accurately reported. County records showed 127 instances in which the standards were exceeded but not reported during the 18-month period. (See p. 39 to 41.) We brought this to the attention of the supervisor who agreed with our findings and promised that, in the future, the reports would be verified and reviewed more carefully to be sure that they are accurate.
3. Air pollution episode plans were not implemented in all cases when the levels of pollutants exceeded the minimum health requirements. When episode plans were implemented, the primary (often the only)

action taken was to warn the public of the danger. In general, available data indicates that the public did not respond to such warnings. (See p. 43.)

The Air Pollution Control Supervisor and the Director of Environmental Resources of Sassafras County and the Director of Audits, EPA, have reviewed this report. Their comments and suggested clarifications are included in the report.

In accordance with the memorandum of audit agreement, we are sending copies of this report to the Maryland State Department of Health and Mental Hygiene and to the Administrator, EPA.

Regional Manager  
U.S. General Accounting Office



UNITED STATES GENERAL ACCOUNTING OFFICE  
WASHINGTON, D.C. 20548

March 31, 1974

Administrator, Environmental  
Protection Agency

Dear Sir:

Enclosed is a copy of our report to the County Council on the results of our audit of the Sassafras County, Maryland, Air Pollution Control Program. Our audit was made in accordance with the GAO Standards for Audit of Governmental Organizations, Programs, Activities & Functions.

We are forwarding this report to you because of your interest and responsibilities in this area. Your attention is invited particularly to pages 21 and 32 which contain recommendations to the Environmental Protection Agency.

A copy of the audit report is also being sent to the Director, Bureau of Air Quality Control, Environmental Health Administration, Maryland State Department of Health and Mental Hygiene.

Sincerely yours,

Regional Manager  
U.S. General Accounting Office

[7]



UNITED STATES GENERAL ACCOUNTING OFFICE  
WASHINGTON, D.C. 20548

March 31, 1974

Director, Bureau of  
Air Quality Control  
Environmental Health Administration  
Maryland State Department of  
Health and Mental Hygiene  
Baltimore, Maryland

Dear Sir:

Enclosed is a copy of our report to the County Council on the results of our audit of the Sassafras County, Maryland, Air Pollution Control Program. Our audit was made in accordance with the GAO Standards for Audit of Governmental Organizations, Programs, Activities & Functions.

We are forwarding this report to you because of your interest and responsibilities in this area.

A copy of the audit report is also being sent to the Administrator, Environmental Protection Agency.

Sincerely yours,

Regional Manager  
U.S. General Accounting Office

REPORT ON AUDIT

AIR POLLUTION CONTROL PROGRAM

SASSAFRAS COUNTY,

MARYLAND

1. Examination of financial operations and legal compliance matters for the period from July 1, 1972, to June 30, 1973.
2. Review of economy and efficiency of operations for the period from July 1, 1972, to December 31, 1973.
3. Review of program results for the period from July 1, 1972, to December 31, 1973.

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U.S. GENERAL ACCOUNTING OFFICE

## CHAPTER 1

### FINANCIAL OPERATIONS AND LEGAL COMPLIANCE

#### A. OPINION ON FINANCIAL REPORT

Our examination of the annual report of expenditures of the county's Air Pollution Control Program for Grant No. 73A-3201-R2 for July 1, 1972, to June 30, 1973 (see p. 12), was made in accordance with generally accepted auditing standards,<sup>1</sup> and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

During this period, salaries of certain personnel were charged to the program, even though the employees involved devoted part of their time to other activities. Such expenditures charged to the program for the fiscal year ended June 30, 1973, approximated \$1,900; approximately \$1,200 was reimbursed under the Environmental Protection Agency (EPA) grant. EPA must determine whether these costs will be allowable or unallowable under the grant.<sup>2</sup>

In our opinion, except for the matter described in the preceding paragraph, the following annual report of expenditures presents fairly the expenditures of the county's Air Pollution Control Program under Grant No. 73A-3201-R2 for the period from July 1, 1972, to June 30, 1973, in conformity with the finan-

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<sup>1</sup>Generally accepted auditing standards and the "Standards for Audit of Governmental Organizations, Programs, Activities & Functions" are the same insofar as examinations of financial statements are concerned; accordingly, either may be cited when giving opinions on financial statements.

<sup>2</sup>In the event numerous costs are questioned, the middle paragraph could be reworded to incorporate by reference a separate schedule of all the questioned costs.

				DO NOT WRITE IN THIS SPACE		
ANNUAL REPORT OF EXPENDITURES AIR POLLUTION CONTROL PROGRAM PROJECT GRANT				1. GRANT NUMBER 73A-3201-R2		
2. NAME AND ADDRESS OF GRANTEE AGENCY  SASSAFRAS COUNTY HEALTH DEPARTMENT COUNTY OFFICE BUILDING SALIVILLE, MD 20850				3. PROJECT PERIOD FROM 7/1/72 THROUGH 6/30/73		
				4. BUDGET PERIOD COVERED BY THIS REP. FROM 7/1/72 THROUGH 6/30/73		
RECEIPTS	5. FEDERAL PROJECT FUNDS AVAILABLE FOR BUDGET PERIOD			\$ 140,000.00		
	6. ELIGIBLE NON-RECURRENT NON-FEDERAL PROJECT FUNDS AVAILABLE FOR BUDGET PERIOD			\$ 115,566.00		
	7. OTHER THAN NON-RECURRENT NON-FEDERAL PROJECT FUNDS AVAILABLE FOR BUDGET PERIOD			\$		
	8. TOTAL NON-FEDERAL PROJECT FUNDS AVAILABLE FOR BUDGET PERIOD			\$ 115,566.00		
	9. TOTAL RECEIPTS AVAILABLE FOR PROJECT EXPENDITURE			\$ 255,566.00		
10. INTEREST EARNED ON FEDERAL FUNDS			\$			
PROJECT EXPENDITURES FOR PERIOD SHOWN IN ITEM 4						
BUDGET CATEGORY		NON-FEDERAL PROJECT FUNDS			FEDERAL PROJECT FUNDS	TOTAL PROJECT FUNDS
		ELIGIBLE NON-RECURRENT	OTHER THAN NON-RECURRENT	TOTAL		
11. PERSONNEL		\$ 72,130.00		\$ 72,130.00	\$ 117,338.00	\$ 189,468.00
12. EQUIPMENT			729.00	729.00		729.00
13. SUPPLIES			5,263.00	5,263.00		5,263.00
14. TRAVEL			11,251.00	11,251.00		11,251.00
15. CONSULTATION & SERVICES			3,280.00	3,280.00		3,280.00
16. ALTERATIONS & RENOVATIONS			104.00	104.00		104.00
17. TUITION						
18. PUBLICATION COSTS						
19. OTHER			12,438.00	12,438.00		12,438.00
20. TOTAL		\$	\$ 105,195.00	\$ 105,195.00	\$ 117,338.00	\$ 222,533.00
TOTAL PROGRAM EXPENDITURES FOR PERIOD SHOWN IN ITEM 4						
BUDGET CATEGORY		PROGRAM EXCLUSIVE OF PROJECT			TOTAL PROJECT FUNDS	TOTAL PROGRAM FUNDS
		NON-RECURRENT	OTHER THAN NON-RECURRENT	TOTAL		
21. PERSONNEL		\$	\$	\$	\$ 189,468.00	\$ 189,468.00
22. EQUIPMENT					729.00	729.00
23. SUPPLIES					5,263.00	5,263.00
24. TRAVEL					11,251.00	11,251.00
25. CONSULTATION & SERVICES					3,280.00	3,280.00
26. ALTERATIONS & RENOVATIONS					104.00	104.00
27. TUITION						
28. PUBLICATION COSTS						
29. OTHER					12,438.00	12,438.00
30. TOTAL		\$	\$	\$	\$ 222,533.00	\$ 222,533.00
31. FEDERAL PROJECT FUNDS						\$ 22,662.00
32. ELIGIBLE NON-RECURRENT NON-FEDERAL PROJECT FUNDS						
33. OTHER THAN NON-RECURRENT NON-FEDERAL PROJECT FUNDS					\$ 10,371.00	
34. TOTAL NON-FEDERAL PROJECT FUNDS						\$ 10,371.00
35. TOTAL UNOBLIGATED BALANCES-PROJECT						\$ 33,033.00
36. CERTIFICATION: I certify that this report is true and correct to the best of my knowledge, and that all expenditures and obligations reported herein have been made in accordance with the regulations governing grants (42 C.F.R. Part 56, as revised) and with terms and conditions of the grant awarded.				CERTIFICATION: I certify that the expenditures and obligations listed in this report were made with my approval.		
SIGNATURE OF FINANCIAL OR OTHER CERTIFYING OFFICER: _____				SIGN ORIGINAL COPY IN SIGNATURE OF AGENCY DIRECTOR _____ INK, "PER" SIGNATURES NOT ACCEPTABLE		
NAME AND TITLE OF CERTIFYING OFFICER (TYPED)  Director of Finance				NAME OF AGENCY DIRECTOR (TYPED)  County Health Officer		
DATE _____				DATE _____		



cial provisions of the grant. (Financial provisions of the grant are indicated in audit guidelines, section II-B, pp. 45 to 47.)

#### Other audit coverage

The county's financial statements for the fiscal year ended June 30, 1973, had been audited by a firm of certified public accountants (CPAs). In its report to the County Council, the auditors expressed their opinion that the financial statements presented fairly the financial position of the various county funds at June 30, 1973, and the results of their operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

In our audit of the Air Pollution Control Program we considered the scope of the CPA's audit and relied on the CPA's evaluation of the county's overall system of internal controls and its tests of the county's compliance with general ordinances and State laws.

Although the county has an internal audit staff, no internal audits had been made of air pollution control activities.

#### B. COMPLIANCE

With respect to the county's compliance with applicable local and State air pollution control laws, we found that:

1. At the time of our audit, a Sassafras County air pollution ordinance had not been passed; the County Council was considering a proposed ordinance.
2. EPA has not yet approved the transportation control strategy proposed by the State of Maryland.

Consequently, our compliance examination was directed primarily to checking the county's compliance with EPA's regulations contained in the grant for the period July 1, 1972, to June 30, 1973. We found no instances of the county's failure to comply with such terms and conditions, except as discussed in subsection 5 below. Our comments and observations on compliance matters follow.

3. Submission of expenditure report

The county submitted its annual expenditure report for the fiscal year ended June 30, 1973, on September 11, 1973, within the required 90 days after the end of the budget period. The report included supplemental schedules of project expenditures by budget category, as required.

4. Plan of scheduled activities submitted

On November 24, 1972, the county submitted to EPA a plan detailing the mutual responsibilities and scheduled activities of the county and the Maryland Bureau of Air Quality Control for the fiscal year ended June 30, 1973, as required.

5. Propriety of expenditures

In our opinion, Federal and non-Federal air pollution program funds were used for the purposes stated in the grant application and for those items in the approved budget, except for the matter discussed on pages 24 and 25, of paying program personnel for time devoted to activities other than air pollution control during the fiscal year ended June 30, 1973. On the basis of our recommendation, the county agreed to revise its procedures to insure that personnel costs are properly charged in subsequent fiscal years to the activities for which the personnel's time is spent.

6. Accounting cutoffs

In our opinion, proper accounting cutoffs and accruals of expenses were made at the end of the fiscal years ended June 30, 1972 and 1973, so that program funds were spent or obligated only during the period of the grant award.

7. Use of program funds

The county made no budget changes requiring prior EPA approval. Comments on specific items requested in the audit guide follow.

- a. For the fiscal year ended June 30, 1973, county records show that there were no transfers of non-Federal funds which substantially altered the scope or purpose of the grant award.
- b. County records also indicate that expenditures of Federal funds did not result in a cumulative increase in the total of any budget category of more than 25 percent, or \$1,000.
- c. The county spent no Federal funds in a budget category other than those approved in the grant, and it did not buy equipment items costing more than \$1,000 each.

8. Federal reimbursement

The county obtained and spent the necessary non-Federal funds for the grant period so that appropriate matching ratio requirements were met.

Total program expenditures for the fiscal year ended June 30, 1973, were \$222,533, as shown by the accompanying financial

report. Pursuant to grant regulations (42 CFR 45 56.5 g), only non-Federal funds exceeding the previous year's non-Federal funds may be matched at a 3 to 1 ratio.

In the fiscal year ended June 30, 1972, the county's non-Federal costs (unaudited by GAO) were \$66,082. The county's (non-Federal) costs in the fiscal year ended June 30, 1973, were \$105,195. Applying the 3 to 1 ratio to the additional \$39,113 in non-Federal funds, the appropriate Federal share was \$117,338. A summary follows.

Non-Federal funds - 1973	\$105,195
Non-Federal funds - 1972	<u>66,082</u>
Additional non-Federal funds	39,113
Matching 3 to 1 ratio	<u>3</u>
Appropriate Federal share	<sup>a</sup> <u>\$117,338</u>

<sup>a</sup>Minor difference due to rounding.

9. Records of financial status

Monthly cumulative reports show the total cost of the activity and the amount by budget category supplied from Federal and non-Federal sources.

10. County complied with methods of measuring air quality specified by EPA

- a. We discussed the county's methods for monitoring and analyzing air quality with officials of the Maryland Bureau of Air Quality Control and the Quality Control Branch, Office of Air Monitoring, EPA. On the basis of our discussions, we believe the county was using EPA-specified methods to measure all pollutants.

- b. Officials of both the Air Pollution Control Section and the Maryland Bureau of Air Quality Control told us that no formal Maryland State evaluation had been made of the county's air monitoring and analysis methods before our review. According to these officials, however, Maryland does review and approve each fiscal grant application containing a detailed explanation of air monitoring and analysis methods. Although the State's review of and comments on the county air monitoring and analysis methods contained in the grant application is beneficial to EPA, a periodic inspection and report would be more reliable. State officials indicated such a procedure would be incorporated into a new State review system.
- c. The county used a spectrophotometer in laboratory analyses which was different from that recommended by EPA. According to county records, it would have cost \$2,800 to purchase a new spectrophotometer with the recommended band width.
- d. We brought this to the attention of EPA air monitoring officials who told us that the difference in band width between the two spectrophotometers would not have a major impact on the quality of sample analyses.
- e. The county measures all pollutants for which EPA has established primary and secondary standards, except hydrocarbons. Maryland monitors hydrocarbons at two county locations as a part of the Maryland-wide air quality monitoring system and furnishes data on hydrocarbon measurements to the county. In our opinion, this arrangement is acceptable

until the county obtains a hydrocarbon monitor.

- f. The county has budgeted funds for a total hydrocarbon methane air monitor but has not purchased this equipment. It is awaiting an EPA determination as to the equipment that will best serve this purpose; it then plans to request approval. This is as required by the approved grant.

## CHAPTER 2

### ECONOMY AND EFFICIENCY

#### A. EQUIPMENT AND SUPPLIES

##### 1. Procedures for purchase of equipment and supplies

We interviewed county officials and examined equipment requisitions, purchase orders, receiving slips, and equipment inventory cards to determine the procedures followed to purchase equipment and supplies.

Equipment and supply needs are usually determined during the year, and necessary funds are requested in the budget for the next year. The Director, Division of Resources Protection, and the Director, Department of Environmental Protection, review the budget for need, technical merit, and resource availability. If unbudgeted equipment and supply needs arise during the fiscal year, the review procedure remains the same.

We noted no instances when unneeded equipment and supplies were purchased and concluded that these procedures were satisfactory.

##### 2. Obtaining economical prices

We interviewed personnel in the Air Pollution Control Section and other county officials and reviewed their records to determine if procedures existed for purchasing equipment and supplies at economical prices.

The county purchasing division purchases all equipment and supplies. For purchases over \$2,000, competitive bids are solicited. The department director must justify to the county purchasing director reasons for not selecting the lowest bidder. The purchasing director told us that deadlocks, although rare, are resolved by the county attorney.

On the basis of personal experience and knowledge of local vendors, an air pollution control official recommends vendors for smaller items of equipment and supplies peculiar to air pollution. A county official said that a stock of the more common items was maintained to take advantage of quantity discounts.

The county's procedures appeared adequate for purchasing equipment and supplies at economical prices.

### 3. Equipment records

The supervisor of the Air Pollution Control Section keeps an equipment and supply "Kardex" file for all equipment and supplies the section purchases. At the time of our audit, equipment inventory was valued at about \$40,000.

Card files include such information as the dates received, costs, vendors, purchase order numbers, and serial numbers. Copies of requisitions are also on file. We tested the accuracy of these records and found no major errors.

### 4. No excess supplies

The Air Pollution Control Section uses about \$450 worth of supplies a month, \$250 of which is for chemicals and laboratory supplies. The value of inventory on hand was about \$1,100.

We compared monthly use rates with the stock of supplies on hand and concluded that supplies on hand were not excessive. Items usable only for air pollution purposes were ordered when needed.

### 5. Equipment condition and usage

Using the equipment records as a base, we verified the existence and condition of selected items of air pollution control equipment and found all to be in good condition. The semiannual report for the first 6 months of fiscal year 1974 indicated,



however, significant outages for three continuous monitors.

To determine if the equipment was being used, we examined summary sheets and log books used for readings and calibrations of equipment, observed the equipment in use, and discussed with its operator the purposes of each item.

Our analysis of air monitoring records showed significant periods when the equipment was not functioning. (See p. 39.) Although the equipment was in good working condition at the time of our audit, we believe that county and State officials should monitor the downtime more closely.

Two items purchased in 1970 were not being used: (1) a large total oxidant analyzer purchased for \$5,775 and (2) stack-testing equipment purchased for \$987. Updated equipment replaced the total oxidant analyzer in fiscal year 1973; discussions are in progress with State officials on how to best dispose of the analyzer.

The stack-testing equipment was purchased in fiscal year 1970 for proposed tests, but no stack testing has been made and none is contemplated. The Air Pollution Control Supervisor told us that stack testing would require more equipment and personnel experience than is available and that the Maryland Bureau of Air Quality Control could make stack tests if needed. He intends to keep the equipment since it may be used at a later time. He did not agree to report it to EPA as excess equipment.

#### Recommendation

We recommend that EPA consider whether this excess equipment could be used by some other grantee.

## B. TESTING

### 1. Economy in testing methods

According to the supervisor, technical merit, rather than economy, primarily determines the best method for collecting and testing samples. An official of EPA's Office of Air Monitoring agreed and said that the first consideration must be which method will best satisfy the need since there are differences in accuracy, response times, and other technical factors.

Although we agree that technical merit must be a prime consideration, economy of price and operation should be reviewed and considered in each equipment purchase.

### 2. Factors considered in air-sampling locations

The Air Pollution Control Supervisor told us that he had used the factors specified in EPA's "Guidelines: Air Quality Surveillance Networks," in deciding the number and placement of sampling stations. These factors included high population densities, meteorology, topography, present and projected land uses, and pollution sources. He based his decisions on knowledge of EPA guidelines, his personal experience, public demands for information, and consultations with Maryland officials.

We obtained a map locating all stations and describing the characteristics of each area, such as its population density, whether it is a commercial or residential district, etc. We visited 9 of 13 stations and verified the locations and descriptions and found the stations to be as described. In our opinion, the county had followed the "Guidelines: Air Quality Surveillance Networks."

### 3. Calibration of equipment

To determine whether sampling and analytical instruments had been calibrated before installation

and routinely thereafter, we examined the records for two of three continuous monitors and interviewed the individual generally responsible for their calibration. According to the records, both monitors were calibrated before installation, checked daily for accuracy, and calibrated thereafter as necessary. The individual responsible for manual sulfur dioxide and nitrogen dioxide monitors said that the only calibration required was that of the needle orifice. He said that this calibration was performed weekly in the laboratory. We were also told that particulate samplers were calibrated every 2 to 3 months when the motors are rebuilt.

### C. PERSONNEL

#### 1. Staff qualifications

We reviewed the files of all personnel assigned to the Air Pollution Control Section to determine whether they met the minimum qualifications in EPA's "Guide Class Specifications for Air Pollution Control Programs in State and Local Programs." Table 1 lists positions in the fiscal year 1973 and 1974 grant applications. We found no cases in which the personnel involved failed to meet experience qualifications.

Table 1

Positions in Fiscal Years 1973 and 1974  
Grant Applications (note a)

<u>Position</u>	<u>1973</u>	<u>1974</u>
Air pollution supervisor	1	1
Sanitarian III	1	1
Environmental health engineer II	1	1
Sanitarian II	2 (1)	2 (1)
Environmental inspector II	1 (1)	1 (1)
Environmental inspector I	9 (2)	9
Laboratory scientist	1	1
Clerk typist	2 (1)	1
Secretary	<u>1</u>	<u>1</u>
Total	<u>19</u> (5)	<u>18</u> (2)

<sup>a</sup> Vacancies as of June 30, 1973, and December 31, 1973, in parentheses.

## 2. Salary determination

According to the county personnel office wage and salary specialist, who is generally responsible for establishing staff salaries, county salaries are derived from wage surveys and a number of outside references, including the annual Local Government Personnel Salary Survey. We compared the salaries for positions in the Air Pollution Control Section with salaries for similar positions, such as health and water quality inspectors, in Sassafras County and found that they were comparable.

## 3. Personnel controls

We interviewed air pollution control officials and reviewed records to determine whether controls were in effect to insure that staff members were on the job and performing their assigned duties. Inspectors keep daily logs and maintain contact with the office by two-way radio. The rest of the air pollution control personnel work in the county office.

We reviewed activity summaries for fiscal year 1973 and for the first half of fiscal year 1974 to determine whether staff members were devoting full time to the program. The activity summaries show that staff members spent (1) 163 hours, costing about \$800, in April 1973 on a solid waste survey and (2) 240 hours, costing about \$1,100, in May and June 1973 on such matters as rubbish and weed control and shopping center inspections. We concluded that it was not proper to charge personnel costs of about \$1,900 to the program which shared costs with EPA.

In view of these questionable charges to the program in 1973, we also reviewed the procedures and time summaries applicable to the first 6 months of fiscal year 1974.

The semiannual report for the first half of fiscal year 1974 indicates that one inspector spent

100 percent of his time on solid waste activities and that three others spent approximately 27 percent of their time on solid waste activities.

#### Recommendation

Because the fiscal year 1974 grant stipulated that the people filling positions would spend 100 percent of their time on air pollution control activities, we recommended that the county revise its procedures so that the program would be charged only for the time of personnel working on that program. The county indicated that when it claimed reimbursement from the Federal Government for 1974, only actual hours spent on air pollution control would be included.

We recommend also that, in the future, the county indicate in its grant applications and the claims for reimbursement the percentages of time each employee spends on air pollution control activities. The Sassafras Director of Environmental Resources said this would be done. EPA Region III officials told us that a determination would be made as to allowability of these costs under Sassafras County's grant.

#### 4. Staff travel

Air pollution control travel expenses for the year ended June 30, 1973, were \$11,251; \$10,338 was local travel. Mileage at the rate of 9 cents for sedans and 15 cents for vans was charged to the program. The Sassafras County Motor Pool furnished vehicles for all local travel.

To determine whether staff travel was program related and approved and whether costs were reasonable, we examined the travel requests for fiscal year 1973.

In fiscal year 1973 the Air Pollution Control Supervisor, with prior approval by the department director and the county chief administrative

officer, attended the annual Air Pollution Control Association meeting at Miami Beach from June 18 to June 22. Actual daily expenses averaged \$38.67.

The air pollution control engineer, with county officials' approval, attended EPA's training course entitled "Control of Gaseous Emissions" at Durham, North Carolina, January 24 to 28, 1973. Average daily expenses were less than \$25 a day.

County travel guidelines state that reasonable actual costs incurred on program-related travel will be reimbursed. We believe that the travel cited above, in addition to all other travel audited, was program related and that costs were reasonable.

#### 5. Staff training

We reviewed the training files and the travel vouchers of air pollution control personnel to determine whether staff training was job related.

In one case the relevance of the staff training to air pollution control appeared questionable. The enforcement chief attended a 2-day course at The George Washington University entitled "Solid Waste Management for Hospitals."

Regarding the relation of the course to air pollution control, the department director said:

"State air pollution regulations controlling emissions from incinerators at hospitals and nursing homes will require significant changes in solid waste disposal practices at these facilities. This course will provide the attending staff member with a better understanding of current practices and alternatives."

Since hospital solid wastes are burned in incinerators, we concluded that the training was program related.

Two individuals attended the bureau's 3-1/2-day training course on the various aspects of the State air monitoring system. The only other training in fiscal year 1973 was a 3-day course on visible emissions given at the University of Maryland for air pollution inspectors.

We concluded the \$965 spent on training was program related.

## CHAPTER 3

### PROGRAM RESULTS

The principal activities of the county's Air Pollution Control Program are air pollution abatement and air monitoring. The goals of the air pollution abatement activity, as stated in the approved grant and report of operations, are to

- effect controls over pollutant emissions from sources specified in State and county air pollution control regulations and
- encourage the elimination or control of unnecessary or excessive air pollution emissions from human activities in the county.

The purpose of the air monitoring activity is to obtain the necessary ambient air quality data so that

- the effectiveness of the abatement program can be measured,
- necessary abatement actions can be taken where ambient air quality levels indicate excessive concentrations, and
- timely actions can be instituted when ambient air concentrations exceed minimum health-related standards.

To assess county progress related to the above goals, we reviewed the activity reports and the supporting records of the Air Pollution Control Section from July 1, 1972, to December 31, 1973. We also reviewed the county's progress toward achieving the specific objectives set forth in the fiscal year 1973 Federal Air Pollution Control Program grant.

The results of our review of the effectiveness of the county's program and its monitoring and abatement activities follow. In reviewing the county's



efforts, it should be noted that in 1973 between 87 and 99 percent of air pollutants in Sassafras County originated from sources controlled by either the State or the Federal Government. Thus, the over-all impact of the county's pollution control efforts are limited.

A. ACTIONS TAKEN BY SASSAFRAS COUNTY  
TO REDUCE AIR POLLUTION

The reduction of atmospheric pollution to the lowest possible levels within given economic constraints is one of the county's principal objectives stated in the EPA grant. To accomplish that objective, several intermediate objectives to be accomplished during 1973 and 1974 were specified in the grant applications. The intermediate abatement objectives and our comments on the county's progress in meeting those objectives follow.

1. Registration and review  
of all existing sources

One objective was to register significant existing sources of pollution in the county by fiscal year 1973. As part of the cooperative agreement, under the Maryland State Implementation Plan, Maryland has requested that the county review all registered sources annually to insure compliance with registration requirements. The county reported in the fiscal year 1974 semiannual report that 2,100 sources had been registered by the end of fiscal year 1973. The Air Pollution Control Section and the State consider this to be all existing sources. In the first half of fiscal year 1974, 926, or 44 percent, of the registered sources were reinspected. Sassafras County reported that all sources would be visited before April 1974.

We reviewed the registration forms of those sources which had been reinspected and discussed the procedures with inspectors. We concluded that the reinspections had been effective in identifying changes in equipment and violations of regulations.

When violations were noted, followup visits were conducted and recorded to insure compliance.

## 2. Incinerator closures

The grant stated that the county would order closure of all incinerators violating Maryland regulations in 1973 and 1974. By the end of 1973, 502 owners or operators had been directed to cease incinerator operations. At December 31, 1973, 42 private incinerators and 13 government incinerators were still operating. Most of these were expected to be phased out either by orders originating from violations or by the July 1974 required phaseout date. Approximately 15 incinerators were to remain in operation after July 1, 1974. These were hospital, pathological, or animal crematory types of incinerators which are permitted by EPA regulations.

## 3. Open burning permits

The grant specified that the county would tighten restrictions on open burning permits and minimize land clearing open fires. The number of open burning permits issued in fiscal year 1973 decreased 21 percent from the number issued in the previous year.

We compared selected declined permits in 1973 with approved permits in 1972 and noted that similar permits which had been approved the previous year were disapproved in 1973.

The county anticipated that after July 1974 there would be a drastic reduction in approved permits due to a Maryland regulation which would increase from 200 to 500 yards the distance requirement between the fire and the nearest occupied structure or heavily traveled public road.

#### 4. Control of particulates from construction and material handling

The county indicated in the fiscal year 1973 grant that a program was to be established for controlling particulates from construction and material handling. Dust and other materials originating from construction projects, unpaved roads, truckloads, and industrial operations continue to be major problems. The Air Pollution Control Section has attempted to define the responsibilities of the Police Department, the Department of Public Works, and the Air Pollution Control Section in obtaining compliance with various portions of the proposed county air pollution control ordinance. However, as of the end of 1973, no final agreement had been reached and the condition remained unchanged.

#### Recommendation

We recommend that the Council, in its consideration of the proposed air pollution control ordinance, define clearly the responsibilities of the county units for enforcing the ordinance.

#### 5. Fuel conversions

Another intermediate goal specified in the grant was to initiate fuel oil and fuel burning equipment changes at schools and other large installations.

The Air Pollution Control Section reported that the abatement unit contacted all users of residual fuel oil and coal who were required to make conversions or add equipment before October 1, 1973. According to the fiscal year 1974 semiannual reports, all facilities were in compliance as of December 31, 1973. A total of 233 conversions to either natural gas or distillate oil were required and occurred through 1973.

The county public school system must convert all of its school facilities from residual fuel oil or install particulate-capturing equipment by

October 1, 1974. As of March 31, 1974, the school system had not submitted a plan for compliance despite Air Pollution Control Section requests.

#### Recommendation

We recommend that the Council require the Superintendent of Schools to submit a fuel conversion plan, as requested by the Air Pollution Control Section.

#### 6. Major source testing

The grant application indicates that by fiscal year 1973, 30 percent of the major sources would be tested for compliance with emission regulations.

According to the fiscal year 1974 grant application, there are nine major sources of pollution in Sassafras County and only one of the required three sources had been tested as of December 31, 1973.

County officials had requested that the major sources be tested by State officials under the cooperative agreement included in the State Implementation Plan. State officials indicated that the testing teams were behind schedule but would be catching up in the next 6 months.

Since the county does not have the expertise or all the equipment to conduct these source tests, it must rely on the State to satisfy this portion of the grant objectives.

#### Recommendation

We recommend that EPA review the State testing schedule to insure that major source testing is accomplished in line with local program grant objectives. Without major source testing, emission standards could be violated without detection and correction.

B. IMPACT OF PROGRAM AS SHOWN  
BY EMISSION INVENTORIES

Trends in emission inventories indicate the effectiveness of air pollution control activities. EPA's "Guide for Compiling a Comprehensive Emission Inventory" states that:

"The proper emission control strategy for a specific air pollution problem is dependent upon an adequate assessment of the nature and extent of the pollution in the region involved. This assessment includes a review of existing levels of pollutants, the sources and their emissions, the techniques available for their control, and the probable increase in source emission resulting from urban and economic growth. The emission inventory indicates the major contributors (motor vehicle, industrial, etc.), and this information, in turn, directs the thrust of control efforts. \* \* \* If the emission inventory is updated annually, a decrease in emissions should be reflected over a period of years. This decrease would then be a measure of the effectiveness and success of the control and could be used to indicate areas where program modification would be useful."

1. Emission inventory trends

Emission inventories are calculations of tons of pollutants emitted into the atmosphere for an entire year for a given geographical area. Calculations are based on fuel consumption and processes which contribute to each type of pollutant. The following table shows the emission inventories from all significant sources calculated by Sassafras County at December 31, 1970, the first period for which such inventories were available and the inventories at December 31, 1972 and 1973.

Table 2

County Emission Inventories

	<u>1970</u>	<u>1972</u>	<u>1973</u>
	<hr/> (tons) <hr/>		
Particulates	6,652	7,951	10,866
Sulfur oxides	67,591	72,596	48,906
Hydrocarbons	72,397	48,783	56,316
Nitrogen oxides	37,246	40,334	44,431
Carbon monoxide	397,023	310,587	335,744

County officials told us that beginning with 1970 the inventories for each of the years were complete and that the composition of pollution sources had not changed significantly.

The inventories show that pollution decreased between 1970 and 1973 for the following pollutants: sulfur oxides, hydrocarbons, and carbon monoxides. The inventories show, however, that two pollutants (particulates and nitrogen oxides) increased between 1970 and 1973.

2. Sources of air pollution

County officials attributed the increase in particulates to emissions from a public utility power plant. Under its Implementation Plan, Maryland is solely responsible for obtaining compliance of power-generating sources in the State. Maryland's Implementation Plan contains an order of the Maryland Secretary of Health and Mental Hygiene to the Sassafras Electric Power Company which requires the company's county generating station to meet specified conditions and schedules and to report directly to the Maryland Bureau of Air Quality Control.

State officials told us that the power company had submitted a compliance plan and that the company was complying with the plan. State officials were

aware of the emission impact of the plant and were closely monitoring it.

The county officials attributed the increase in nitrogen oxides to emissions from (1) the same power-plant and (2) motor vehicles over which the Federal Government has primary responsibility for pollution control.

The table below shows, for December 31, 1972 and 1973, the extent that the county was responsible for controlling the pollution sources. The percentages are based on emission inventories prepared by Sassafras County.

Table 3					
	Partic- ulates	Sulfur oxides	Hydro- carbons	Nitrogen oxides	Carbon monoxide
	(percent)				
POLLUTANTS IN 1972:					
Sources not under control of the county:					
Power generation (one plant)	68	94	1	37	-
Mobile sources	<u>13</u>	<u>1</u>	<u>97</u>	<u>57</u>	<u>99</u>
Subtotal	81	95	98	94	99
Sources under the control of the county	<u>19</u>	<u>5</u>	<u>2</u>	<u>6</u>	<u>1</u>
Total	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
POLLUTANTS IN 1973:					
Sources not under control of the county:					
Power generation (one plant)	77	92	1	39	-
Mobile sources	<u>10</u>	<u>2</u>	<u>97</u>	<u>55</u>	<u>99</u>
Subtotal	87	94	98	94	99
Sources under the control of the county	<u>13</u>	<u>6</u>	<u>2</u>	<u>6</u>	<u>1</u>
Total	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>

The above table shows that, in 1972, the power-plant and motor vehicles--for which air pollution control are the responsibility of the State and Federal Government--accounted for between 81 and 99 per-cent of the five pollutants in the county. In 1973

those sources accounted for between 87 and 99 percent of the pollutants.

Pollution sources for which the county is responsible accounted for 1 to 19 percent of the pollutants in 1972 and 1 to 13 percent in 1973, with the largest percentage applying to particulates. Thus, of the county efforts, those directed at controlling emissions of particulates have the greatest impact on improving air quality. This is due primarily to the county's efforts to close incinerators and convert coal and residual oil furnaces to cleaner sources of energy.

As shown below, the tons of particulates emitted from sources for which the county is responsible decreased during 1973.

Table 4

	<u>1972</u>	<u>1973</u>
Emission inventory, particulates in tons	7,951	10,866
Emissions (percent) from sources for which the county has responsibility	19	13
Particulate emissions from those sources (tons)	1,511	1,413
Decrease in 1973 (about 7%)		98

C. QUALITY OF AIR

National primary ambient air quality standards define levels of air quality which the Administrator of EPA judges are necessary, with an adequate margin of safety, to protect the public health. EPA established standards which include the following:



## National Air Quality Primary Standards

<u>Pollutant</u>	<u>Concentration - period</u>	<u>Frequency not to be exceeded</u>
Sulfur oxides	<sup>a</sup> .14 ppm - 24 hour average	Once a year
Particulates	<sup>b</sup> 260 mg/m <sup>3</sup> - 24 hour average	Once a year
Carbon mon-oxide	9 ppm - 8 hour arithmetic average	Once a year
Photochemical oxidants	.08 ppm ozone - hourly average	Once a year
Nitrogen dioxide	.05 ppm - annual arithmetic average	Yearly average not to be exceeded

<sup>a</sup>Parts per million.

<sup>b</sup>Milligrams a cubic meter.

Photochemical oxidants are the result of chemical reactions which take place in the atmosphere between nitrogen oxides and hydrocarbons under the influence of sunlight. The amount of hydrocarbons in the atmosphere limits the maximum amount of photochemical oxidants which can be formed.

### 1. Standards exceeded in Sassafras County

Our comparison of the EPA standards and the samples taken by the county during fiscal year 1973 and the first half of fiscal year 1974 are presented in table 5 on the following page.

Because the standard for photochemical oxidants is for 1-hour periods, it is possible for the standard to be exceeded up to 24 times in 1 day. To

properly gauge the quality of air in a given location, it is necessary to know both the number of times and the number of days standards were exceeded.

Table 5

	Number of times primary standards were <u>exceeded</u>	Number of days on which standards <u>were exceeded</u>
Fiscal year 1973:		
Particulates	-	-
Sulfur oxide	-	-
Nitrogen oxide	-	-
Carbon monoxide	24	24
Photochemical oxidants	<u>66</u>	<u>17</u>
Subtotal	<u>90</u>	<u>41</u>
First half of fiscal year 1974:		
Particulates	-	-
Sulfur oxide	-	-
Nitrogen oxide	-	-
Carbon monoxide	17	17
Photochemical oxidants	<u>106</u>	<u>28</u>
Subtotal	<u>123</u>	<u>45</u>
Total	<u>213</u>	<u>86</u>

As shown, the primary standards for carbon monoxide and photochemical oxidants were exceeded 86 days during the 18 months. The standards were exceeded more during the first half of 1974 than during the entire 1973 fiscal year.

The Metropolitan Council of Governments' news releases indicate that emissions from mobile sources in conjunction with adverse meteorological conditions were the probable reason the standards were exceeded. As indicated previously, pollution control responsibility for new mobile sources is assigned to the Federal Government.

Records of air quality monitoring data showed that readings were not taken on several days because equipment was being calibrated or had malfunctioned. On other days readings were not taken every hour. The following table shows the extent that the data shown in table 5 is incomplete.

	<u>Number of days during which monitors were calibrated or malfunctioned</u>	<u>Total hours for which no samples were taken</u>	<u>Percent of hours with no data</u>
Fiscal year 1973:			
Carbon monoxide	88	1,852	21.1
Photochemical oxidants	240	2,619	29.9
First half of fiscal year 1974:			
Carbon monoxide	43	624	14.3
Photochemical oxidants	56	917	21.0

If standards for carbon monoxide or photochemical oxidants were exceeded during these periods, no record was made. Instances of standards being exceeded therefore may have been more than shown in table 5.

## 2. Instances of standards exceeded not reported by the county

The county's report of operations for fiscal year 1973 and its semiannual report for the first 6 months of fiscal year 1974 reported the number of times pollutant levels exceeded ambient air quality standards as follows.

Table 7

Reported number of times  
standards were exceeded

<u>Pollutant</u>	<u>Fiscal year 1973</u>	<u>First half fiscal year 1974</u>
Carbon monoxide	19	10
Photochemical oxidants	<u>31</u>	<u>26</u>
Total	<u>50</u>	<u>36</u>

As may be seen by the following comparison,  
Sassafras County did not report 127 instances of the  
standards being exceeded during the 18-month period.

Table 8

Comparison of actual with  
reported instances of standards exceeded

	<u>Fiscal year 1973</u>	<u>First half fiscal year 1974</u>	<u>Total</u>
Actual recorded instances of standards being exceeded:			
Carbon monoxide	24	17	41
Photochemical oxidants	<u>66</u>	<u>106</u>	<u>172</u>
Total	<u>90</u>	<u>123</u>	<u>213</u>
Reported instances of standards being exceeded:			
Carbon monoxide	19	10	29
Photochemical oxidants	<u>31</u>	<u>26</u>	<u>57</u>
Total	<u>50</u>	<u>36</u>	<u>86</u>
Unreported instances of standards exceeded	<u>40</u>	<u>87</u>	<u>127</u>

Of even greater importance, the reported instances made it appear as though the efforts at controlling air pollution in Sassafras County in the first half of fiscal year 1974 were much more effective than they had been. Standards had been exceeded a greater number of times in the first half of fiscal year 1974 than in all fiscal year 1973.

The county explained that this occurred because summaries prepared by the environmental health engineer were erroneous and the Air Pollution Control Supervisor did not verify the reports before publication. To the extent that we could determine, the errors by the engineer were simply inadvertent arithmetic errors.

### Recommendation

We brought this to the attention of the Air Pollution Control Supervisor and recommended that future reports be reviewed more carefully. The supervisor agreed with our findings and promised that, in the future, the reports would be reviewed carefully to be sure that they are accurate.

We also recommended that the county fully comment on this situation in its report to the State on compliance with the State Implementation Plan and the report to EPA on status of the program. The Air Pollution Control Supervisor agreed and the next report of operations will contain comparative statistics.

### 3. Actions taken when pollution reached danger levels

Maryland's Implementation Plan contains an air pollution episode plan designed to control pollutant emissions during periods of poor atmospheric ventilation and rising levels of pollution concentrations where danger is imminent regarding human health. The Maryland State Implementation Plan also recognizes a regional air pollution episode plan adopted by the Metropolitan Council of Governments. Both plans specify one forecast and three action stages based on episode criteria recommended by EPA.

According to statements of responsibility in the two episode plans, either the Council or Maryland would initiate episode plan action for the county.

County records show that during the 18 months reviewed, the episode criteria were exceeded on 33 days; however, records of the Maryland Bureau of Air Quality Control and the Council showed that episode plans were put into effect on only 9 of those days.

According to a Council official, the Council does not initiate an episode alert unless the criteria are exceeded in more than one jurisdiction. The Council obtains hourly readings of pollutants for each jurisdiction. However, records were not kept for the period we audited. We did not review air monitoring data in other jurisdictions to determine whether the episode criteria were exceeded in other jurisdictions on the same days that they were exceeded in Sassafras County.

An official of the Air Pollution Control Section told us that Sassafras County increased monitoring activities, contacted all holders of open burning permits, and told police and fire departments of bans on open burning and insecticide and herbicide spraying. Sassafras County also participated in conference calls with the Council and Maryland officials. The county did not notify incinerator operators because the incinerators are not major sources of the pollutants which exceeded primary standards.

The county did not call all sources required by Maryland to submit a standby emission reduction plan. According to county officials, this action was not taken because the State Secretary of Health and Mental Hygiene has not formally approved any of the plans. Maryland officials said that, even if these plans had been approved, the conditions in the county would not have caused the plans to be implemented.

## Effects of episode plans

In our judgment, the only major actions taken were news releases made by the Council. The releases informed citizens of the air pollution situation and advised the elderly and persons with heart, respiratory, and other conditions sensitive to air pollution to stay indoors. Since the concentration of pollutants came mainly from motor vehicle exhausts, commuters who usually traveled to work by automobile were urged to form carpools or use public transportation.

The county did not have data to indicate whether persons with heart, respiratory, or other conditions complied with the county's advice. The Council has indicated, however, that there was a general lack of response to news releases requesting persons to form carpools or use public transportation. On the days of episodes, there were no major increases in public transportation ridership.

## Prospects of meeting 1975 goals

Although Sassafras County has met many of its intermediate abatement goals, the national air standards for carbon monoxide and photochemical oxidants are being exceeded at an increasing rate. Since the sources of these pollutants are not effectively under county control, the county will be forced to rely on actions by the State and Federal air pollution control agencies. Unless there are dramatic changes in the efforts of these agencies, the prospects of the air pollution standards being met in Sassafras County by 1975 are not good.

GUIDELINES FOR AUDIT  
OF  
AIR POLLUTION CONTROL PROGRAM  
SASSAFRAS COUNTY, MARYLAND

I. INTRODUCTION

Under the 1967 Air Quality Act and the Clean Air Act of 1970, the Congress provided for technical and financial assistance to support air pollution prevention and control programs at the State and local levels on the belief that prevention and control of air pollution at its source is the primary responsibility of these governments. Since 1968 Sassafras County has received Federal assistance from EPA to finance an Air Pollution Control Program. Sassafras County's plan of operation is a part of the Maryland State Implementation Plan. A Federal requirement specifies that the plan be implemented by 1975.

The purpose of this audit is to evaluate all aspects of Sassafras County's Air Pollution Program: financial statements and compliance, economy and efficiency, and program results.

II. FINANCIAL REPORT AND COMPLIANCE

A. OPINION ON FINANCIAL REPORT

Determine whether the program's expenditure report is fairly presented and give an appropriate opinion.<sup>1</sup>

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<sup>1</sup>Financial audit procedures should be more encompassing but, for purposes of this illustration, they have not been expanded.



As part of this examination, the auditor should evaluate the system of internal controls and consider the results of that evaluation in determining the extent that transactions should be tested.

The auditor should also determine what other audits have been made of air pollution control activities in the county and whether any part of such audits can be used for purposes of this audit.

B. COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS

1. Determine whether a local air pollution control ordinance has been passed and, if so, whether the county is complying with its provisions.
2. Determine whether EPA has approved the transportation control strategies in the State Implementation Plan. If so, determine whether the county has complied.
3. Determine whether Sassafras County submitted the required annual expenditure report within 90 days after the end of the budget period.
4. The fiscal year 1973 grant application specifies that support beyond December 1972 was contingent upon submission by November 30, 1972, of a plan detailing the program's scheduled activities. Determine whether this condition was complied with.
5. Determine whether program funds, Federal and non-Federal, were used only for the purposes stated in the grant application and for those items enumerated in the approved budget.
6. Determine whether proper accounting cutoffs and accruals were made so that program funds were spent and/or obligated only during the budget period covered by the award.

7. Determine whether Sassafras County obtained prior approval of EPA for budget changes involving:
  - a. Transfer of non-Federal funds that would substantially alter the scope or purpose for which the grant award was made.
  - b. Expenditures of Federal funds that would result in a cumulative increase in the grant total of any budget category of more than 25 percent, or \$1,000, whichever is greater.
  - c. Expenditures of Federal funds that would be made in a budget category for which no funds were approved.
  - d. Acquisition of any item of equipment costing in excess of \$1,000 which was not specifically enumerated in the approved grant application and which is wholly or partly supported by Federal funds.
8. Determine whether Sassafras County obtained the necessary non-Federal funds for the grant period and spent such funds so that appropriate non-Federal/Federal matching ratio requirements were attained.
9. Determine whether fiscal records show on a current basis the amount and disposition of Federal funds received, the total cost of the activity in connection with which such funds were provided, and the amount of that portion of the cost of the activity supplied by non-Federal sources.
10. EPA has established primary and secondary standards for measuring ambient air quality. The standards are set for six pollutants as are the methods for measuring their presence in the air. For the standards and methods, refer to the following paragraphs of Federal Register Vol. 36, No. 84, Part II, April 30, 1971. In regard to the measurement of air quality:

- a. Determine whether the methods specified by EPA are used by Sassafras County for monitoring and analyzing air quality.
- b. Determine whether the Maryland air pollution agency evaluates Sassafras County's methods of air quality measurement for compliance with EPA specified methods.
- c. Cite those instances where Sassafras County's methods are different from EPA's prescribed methods.
- d. Where Sassafras County uses other than an EPA prescribed method, obtain an expert opinion as to the validity of the measurement that was obtained using the alternate methods.
- e. If Sassafras County does not measure all six pollutants, determine why the pollutants are not being measured and if there are plans to measure them in the future.
- f. If a total hydrocarbon-methane air monitor was purchased in whole or in part with Federal funds, determine whether prior approval was obtained from EPA.

### III. ECONOMY AND EFFICIENCY

#### A. EQUIPMENT AND SUPPLIES

1. Determine whether procedures exist to preclude purchase of other than needed equipment and supplies.
2. Determine whether procedures exist to promote purchase of equipment and supplies at economical prices.
3. Determine whether equipment records are maintained and, if so, comment on their accuracy.

4. Determine whether excess supplies are on hand.
5. Physically verify the existence of a representative number of items and determine whether the items are in good working order and in use.

B. TESTING

1. Determine what basis Sassafras County used to choose its methods of collecting and testing air samples and what consideration was given to economy in making that choice.
2. In decisions regarding the number and placement of sampling stations, determine whether Sassafras County considered factors specified in, "Guidelines: Air Quality Surveillance Network," EPA, May 1971.
3. Determine whether sampling and analytical instruments were calibrated before installation and routinely thereafter.

C. PERSONNEL

1. Determine whether the program's staff meets EPA's minimum qualifications in its publication "Guide Class Specifications for Air Pollution Control Positions in State and Local Programs," July 1971.
2. Determine the procedures for establishing staff salaries.
3. Determine whether controls are in effect to insure that staff are on the job and performing their duties. For any staff not devoting full time to the program, determine whether procedures are adequate to insure that the portion of time charged to the program is reasonable.

4. Determine whether staff travel was program related, whether proper prior approval was obtained, and whether costs appear reasonable. Use \$25 a day as a basis for judging the reasonableness of per diem costs. Report instances where this amount was exceeded.
5. Determine whether staff training was job related.

#### IV. PROGRAM RESULTS

- A. Determine whether Sassafras County has achieved its intermediate abatement objectives as stated in 1973 grant application. Specifically, determine the objectives and accomplishments in regard to:
  1. Registration and review of existing sources.
  2. Incinerator closures.
  3. Open burning permit issuances.
  4. Construction and material handling controls.
  5. Fuel conversions.
  6. Major source testing.
- B. Determine whether Sassafras County is achieving its goals of reducing air pollution:
  1. Obtain and report inventories calculated for pollutant emissions at the end of 1972 and 1973, and compare with the earliest inventories available to determine changes in pollutant levels.
  2. Obtain and report on the percentage of the sources that are controllable by Sassafras County and those noncontrollable by the county at the end of fiscal years 1972 and 1973.

- C. Determine whether there have been any instances where pollution levels in Sassafras County have exceeded EPA's primary National Ambient Air Quality Standards. If so:
1. For the 18 month period ended December 31, 1973, determine the number of days in which a primary standard has been exceeded identifying the pollutant(s) and the cause or probable cause of the high pollutant level and whether these instances were appropriately reported.
  2. Determine whether the instances when the standards were exceeded were properly reported.
  3. Determine whether the Maryland Air Pollution Episode Plan was put into effect when applicable criteria were exceeded. Determine if there were differences between actions specified in the Plan and actual actions taken. Obtain explanations for any deviations from the plan.

## Appendix B

### Selected Subject-Oriented Reference List

Much has been written that relates to the subject matter discussed in this publication. In the following listing, the practitioner will find references that offer further illumination of many of the elements of the still evolving art of evaluating economy, efficiency, and program results. Some references are more technical, some are more philosophical. They are listed by subject groupings, stressing the title rather than author to facilitate a quick review of the listing to find material on a specific topic.

While the list is extensive, it is also selective in that much more has been published on these subjects. As a key reading list, the following are suggested:

- *Standards for Audit of Governmental Organizations, Programs, Activities & Functions*. Washington, D.C.: U.S. General Accounting Office, 1972.
- *Questions and Answers on the Standards for Audit of Governmental Organizations, Programs, Activities & Functions*. Washington, D.C.: U.S. General Accounting Office, September 1974.
- *Auditing Standards Established by the GAO—Their Meaning and Significance for CPAs*. New York: AICPA, 1973.
- *Audits of State and Local Governmental Units*. New York: AICPA, 1974.
- "Management or Operational Auditing." Elmer B. Staats, Comptroller General of the United States. *The GAO Review*, Winter 1972, pp. 25–35.
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- II. Efficiency and Program Results Evaluations for Government
- III. Operational and Management Auditing Concepts and Techniques
- IV. Evaluating Specific Program Areas
- V. Managing and Reporting on Efficiency and Program Results Evaluations

The references under each of these major headings will be divided into two groups: (1) complete books or publications and (2) references to specific articles in periodicals. Material authored by the U.S. General Accounting Office or a GAO official is identified with an asterisk.

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